

# COAL AGE

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## As It Might Be

BY BERTON BRALEY

*Written expressly for Coal Age*

"Twas a wonderful dream," said Dugan,  
"The dream that I dreamed last night,  
For I thought I wint to a fancy mine  
Where the breaker was painted white  
An' the coal on the belt conveyor  
Was polished until it shone,  
An' wrapped up in tissue paper  
An' scented wid sweet cologne.

"An' instead av the breaker huskies,  
Was beautiful girls—'tis so—  
Wid gloves on their lily fingers  
An' uniforms white as snow,  
They handled the coal wid tweasers,  
An' a boy wid an inlaid tray  
He tuck the slate as they picked it out  
An' carried it all away.

"They'd gilded the hoisting engine  
An' the cables was gilded, too,  
An' the cages was finished in blue an' gold  
A wonderful sight to view,  
An' all of the lady miners  
Was natty an' spick an' span,  
Wid their handcarved picks an' their  
jeweled lamps  
An' each wid her ivory fan.

"They'd kalsomined all the entries  
An' papered most every room,  
An' Japanese lanterns was all about  
Dispellin' the heavy gloom,  
They'd muffled each drill an' cutter  
An' carpeted every floor,  
An' bouillon was served 'em at half  
past one  
An' tea was at half past four.

"So I says to the lady foreman  
(A regular handsome queen),  
'Say, who is the boss of this spotless  
mine  
An' what does the whole thing mean?'  
An' she says, 'Tis an object lesson,  
An' its glory shud travel far,  
For this mine is run by the Woman's  
Club  
Wid the aid of the D. A. R.!"

"Twas a wonderful dream," said Dugan,  
"I'm sorry 'twas done so quick,  
For I hadn't quite—there's the pit  
boss now,  
Say, gimme that bloomin' pick!"

# The Ramsay Revolving Car Dump at the Woodward Ore Mines

BY H. S. GEISMER\*

**SYNOPSIS**—A revolving dump which handles four loaded cars weighing 40,000 lb. gross. The actual dumping requires only about two seconds, while the entire process of weighing the loaded cars, dumping and reweighing the empties requires about one minute.

The announcement that the H. C. Frick Coke Co. has contracted for a revolving car dump (of the type patented by Erskine Ramsay, of Birmingham, Ala.) for its Lemont No. 2 mine, which will be 176 ft. long and will be capable of dumping a trip of 18 mine cars without detaching from the haulage rope, led to the belief that

dumping and passing the scale on the return trip is one minute. The actual time required to revolve the dump is only about two seconds.

The loading of the ore at this particular mine is done by contractors and the contents of all of the four cars on any one trip belongs to one man. This simplifies the work of weighing considerably, as the four cars can be weighed and credited by a single entry on the tally sheets and only one check is required to be placed on each trip.

The average length of haul to the various entries off the main slope from the mouth of the mine is  $\frac{3}{8}$  of a mile, and the average time consumed in making the



FIG. 1. A GENERAL SIDE VIEW OF THE DUMPING PLANT

a description of one of these dumps now in operation would be of interest to coal-mine officials.

The dump shown in the accompanying illustrations was installed by the Woodward Iron Co. at its iron ore mine, Slope No. 3, near Woodward, Ala., about five years ago, and has been in continuous successful operation ever since. It is designed to handle four loaded cars containing a maximum of 30,000 lb. of ore in addition to a tare weight of 10,000 lb., or a total weight of 40,000 lb.

The average time consumed in stopping the trip on the scale, weighing, pulling the cars into the dump,

round trip into the mine, including the time required to do the dumping, is six minutes.

The average output of the mine is 900 long tons, and this is generally handled between the hours of 10 a.m. and 5.30 p.m. Between 7 and 10 a.m., most of the men are timbering and loading, and the hoist is kept busy handling material.

The dump is revolved by means of an air-operated piston in a vertical cylinder, which may be plainly seen in the illustrations. The up-and-down movement of the piston is transmitted to the dump cylinder by means of a wire rope. On the up-stroke of the piston, the dump

\*Keiser-Geismer Engineering Co., Birmingham, Ala.

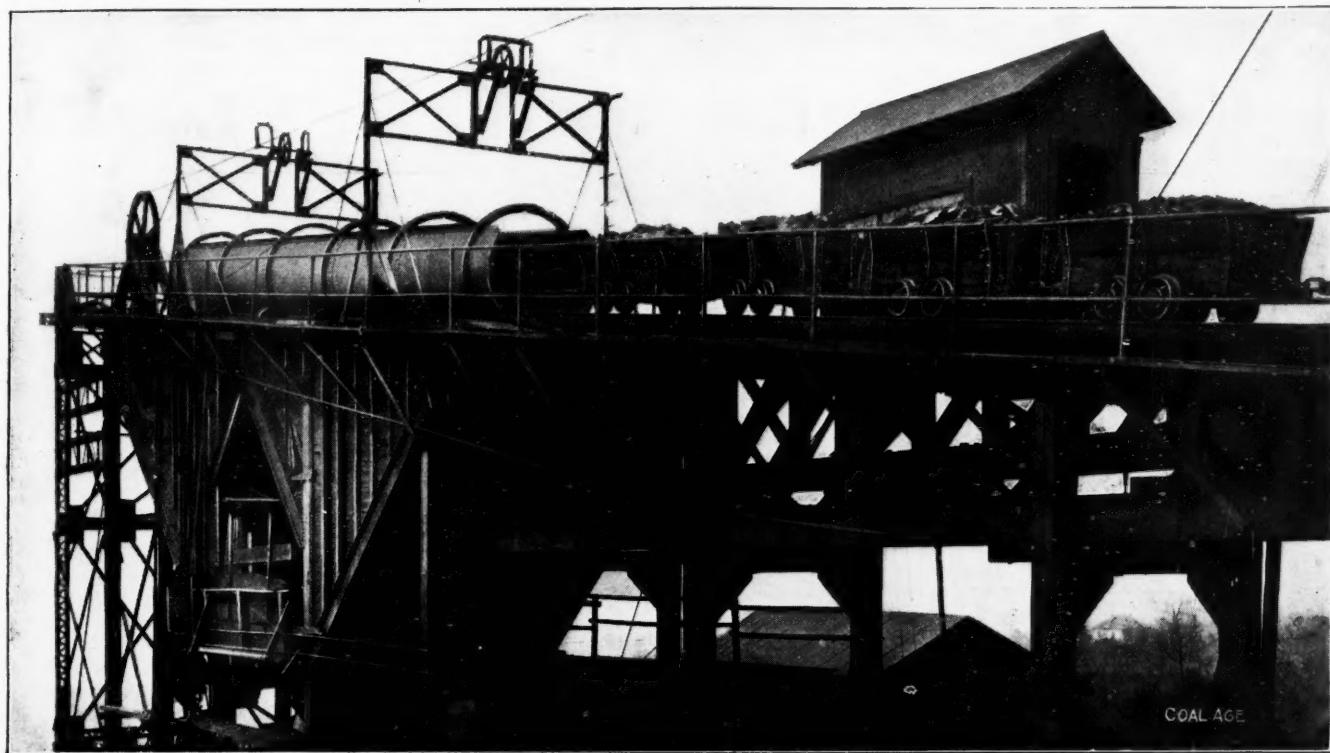


FIG. 2. ANOTHER VIEW, SHOWING WEIGH HOUSE, DUMP, CABLE AND OPERATING CYLINDER

is revolved about  $200^{\circ}$ , and then, on the down stroke, it is brought back to normal position.

In some of the dumps now built, the cylinder is designed to receive a complete revolution in one direction on the up stroke, and a similar movement but in the opposite direction on the down stroke. In this way, the coal or ore is dumped into the two sides of the bin underneath, alternately.

The power used in the cylinder of the Woodward dump is compressed air, at about 75 lb. pressure. This is piped

from a receiver which furnishes air to the rock drills on the inside of the mine, to a small horizontal receiver shown in Fig. 1, just to the left of the vertical cylinder. The operating power generally used is steam, but at this plant no steam was available near the tipple location.

#### ONLY ONE MAN REQUIRED FOR DUMPING

One man only is required to operate this dump to its capacity. He weighs the cars first; then, after they have entered the dump, he discharges their contents by ma-

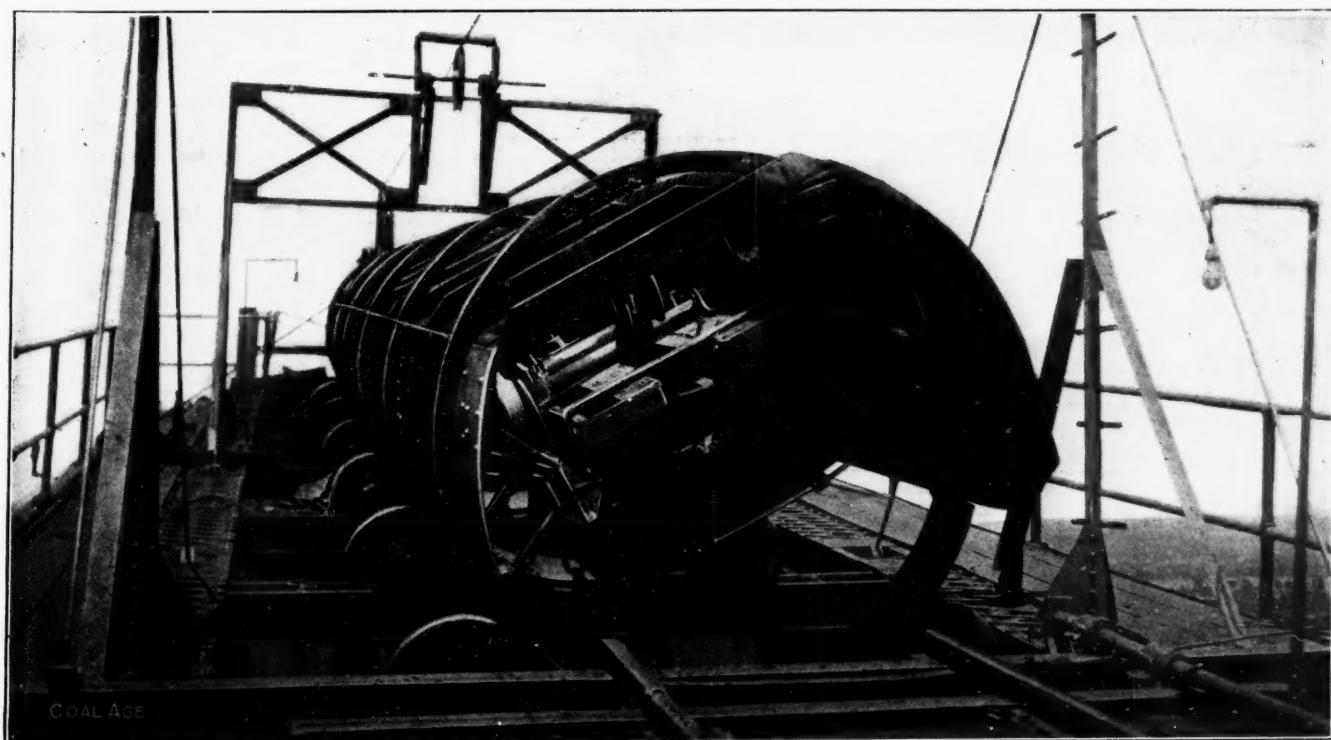


FIG. 3. THE REVOLVING DUMP IN OPERATION

nipulating a valve in the weigh house. The dump is built on an inclination of approximately 12 per cent., which is sufficient to start the cars back by gravity, as soon as the hoisting engineer gives slack rope. The hoist is a geared electric machine and is located a few hundred feet from the dump, and exactly over the center line of the slope. As one man operates the hoist, only two men are required to do the hoisting and dumping.

In Fig. 0 the trip of loaded cars is shown standing on the scales; the small building just beyond is the weighman's house, and the scale beams are clearly seen extending horizontally about midway between the ground and tipple floor. The scale is also plainly shown in Fig. 1.

In Fig. 2 the trip of empty cars is seen just ready to start back into the mine. Fig. 3 shows the dumping cylinder revolved 90° and the cars beginning to empty.

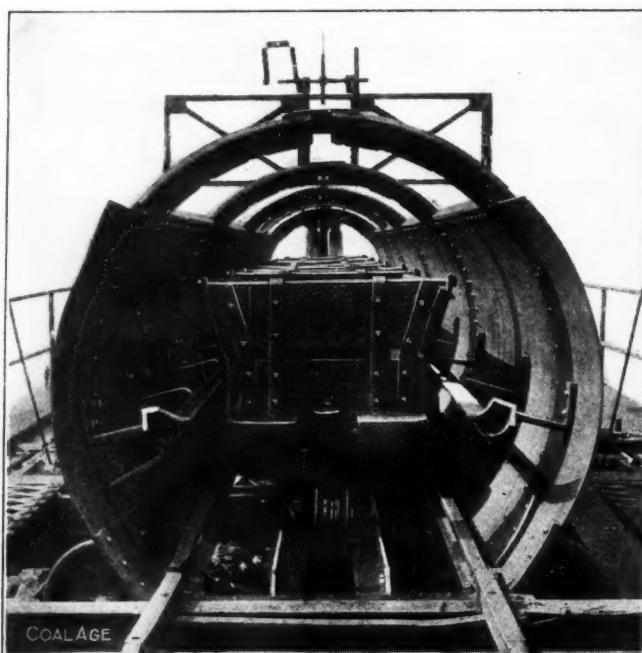


FIG. 4. THE TRIP AFTER DUMPING; READY TO RETURN TO THE MINE

In Fig. 4, the inside of the revolving cylinder can be seen distinctly, also the car wheels on the outside upon which the cylinder is supported and revolves.

By referring to Fig. 1, it will be seen that the ore, after being dumped into bins, is fed by gravity into a gyratory crusher underneath, from whence it drops into railroad cars and is hauled to the company's furnace located only a few miles distant. The entire tipple, with the exception of the siding of the bin, is constructed of steel.

Dumps similar to that employed at Woodward have been installed and are now in operation at coal mines as follows: One in Pennsylvania, two in Tennessee, one in Utah, one in Alabama. Those now in operation were designed for capacities varying from two to six cars.

#### THE ADVANTAGES OF THIS TYPE OF DUMP AT COAL MINES

In considering this type of dump for coal-mine service, several distinct advantages are apparent. A car without drop bottom or end grates can be used, which eliminates largely the scattering of coal along the haulage ways, due to fine particles sifting through cracks, and also the accidental opening of doors, while the trip is in motion,

often at high speed. This reduces, to a marked degree, the liability of dust explosions, and also cuts down the cost of maintenance on haulage ways.

It further eliminates, to a noticeable extent, the number of wrecks on haulage roads and the troublesome delays that follow, especially where mechanical haulage is employed. The solid-end car is also lighter and consequently easier to handle than any other type, and costs less for repairs, as it is much more rigid and will stand more abuse.

Only during the past few years has the importance of keeping haulage ways free from coal dust been fully understood, and, as a result, the demand for tight, well constructed cars is becoming more and more noticeable.

This type of dump is not as hard on cars as the ordinary horn dump, since the cars are not stopped and started suddenly; even while they are being revolved they are held firmly in place, by means of the angles just over the wheels, as illustrated in Figs. 3 and 4.

To reduce the breakage to a minimum, where lump coal is desirable, a bin can be constructed the entire length of the dump, with sides coming up close to the edge of the cars when they are in dumping position.



## The Bonding of British Exports

### SPECIAL CORRESPONDENCE

The British government is urging the merchants and traders of the United Kingdom to go on with business as usual. They desire especially that the export coal trade should continue to neutral countries, as otherwise thousands of sailors, dock workers, railway employees, and miners will become idle, increasing the number of those for whom relief work must be found. The coal exporters have replied that they are willing to keep their trade going in the face of the serious war risks and the chance of nonpayment, but they cannot undertake the serious handicap imposed by the government in the form of a bond for treble the value of a cargo. The coal exporters feel that the government is putting the responsibility on the wrong party.

If the bond cannot be entirely removed, the coal men feel there ought to be an exemption in the case of British ships with cargos for a neutral port. An affidavit or declaration of destination should be sufficient, with proof of arrival. In the case of neutral ships a bond for a reasonable amount should be required of the owners or masters, with British sureties, and proof of arrival but not of delivery.

The matter is of such vital interest to the coal exporters of the United Kingdom that the shippers of the Bristol Channel, Humber, Tyne and Scotland have made joint representations to the government and have asked them to receive a deputation of representatives of all these districts, so that their case may be placed before the proper authorities.



The electric conducting power of a substance is usually expressed in terms of its resistance, rather than conductivity. A wire that is high in conductivity is low in resistance, and vice versa. Resistance is that property of a conductor, by virtue of its form and molecular structure, which modifies the strength of current flowing through it. It is an inherent property of all electrical conductors. Even the best conductors possess appreciable resistance.

# Shaft Sinking in the Central Field of Alberta

BY E. I. ROBERTS\*

*SYNOPSIS—The machinery and other equipment necessary to sinking operations in this field are enumerated, the organization and method of procedure detailed and an estimate given of the total cost of a shaft per lineal foot.*

¶

It is my desire to show some of the difficulties experienced in shaft sinking in the Central Field of Alberta and to explain how they may be overcome.

The methods and expense of sinking operations are controlled by three factors: First, the mine location relative to the base of supplies; second, the condition of the country; third, the class and expense of labor.

In the first place, machinery and supplies are obtained from eastern Canada, Great Britain or the United States, meaning a considerable delay before material reaches the field, therefore with all machinery orders there should be sent a complete order for repair parts.

A good plan for a person considering shaft sinking is to order material and supplies in October, so that operations in the field can be commenced in March or April of the following year, enabling a whole summer's work to be done before winter holds up the work. The spur from the railway to the mine site will also delay operations, and six months has to be allowed therefor.

The second factor is the nature of the country. It may be prairie, or rolling and timbered. On the former, every supply has to be shipped in, and test holes for water bored, while in rolling and timbered localities, sufficient creeks are found, as well as material for temporary structures.

In the estimates, allowance should be made for clearing the mine site and for extra engineering costs, when country is timbered. Camp and boarding supplies may be obtained from neighboring farmers, or if the surrounding homesteads are not settled, all these have to be shipped in.

The last factor is that of labor. This in the Central Field has been unsatisfactory from a mining or sinking standpoint. Competent shaft sinkers and mechanics are at a premium. The class of labor used has to be trained in every particular, and good wages paid. Men may be shipped in, however, giving the advantage of greater sinking speed and the disadvantages of the company paying transportation and being subject to the dissatisfaction of this labor. The other solution of this problem is to reduce the manual question to one of machinery.

These three factors having been met, preparatory work is commenced, consisting of clearing and the boring of a test hole within 100 ft. of the shafts. Hard shales and sandstone formations are usually found, and as pockets of quicksand are liable to be met, this bore hole will make known the actual conditions.

Equipment is the next consideration. This is subject to: First, the intended size of the shaft or shafts, which in turn will determine the size and quantity of sinking material. Second, a time-limit factor, which

means an added expenditure for time- and labor-saving appliances; there is also the question as to whether the two shafts are to be sunk simultaneously. Third, the depth of the shaft, upon which depends the nature, quantity and size of shaft lining and hoisting appliances. The size and number of temporary buildings and living accommodations are also controlled by this factor. Fourth, the nature of the strata encountered which will determine the method of drilling shot-holes, size of shaft lining and quantity of water to be pumped.

## A TYPICAL CASE CONSIDERED

Considering a typical example of the equipment for the sinking of two 14x18-ft. shafts, 500 ft. deep, the arrangement of the buildings as shown in Fig. 1, with their respective fixtures, will be taken in order.

The boiler room, engine room, two hoist rooms, supply house, wash house and office are all under one roof, thus making the most economical type of building.

It is suggested that the boiler house be equipped with a 100-hp. vertical boiler. This type is chosen because of the ease of transportation and erection, as well as the little space occupied. The company furnishing the boiler should also supply flanges, piping and connections to the generator, compressor, etc.; also an additional length of smoke-stack or some other blower arrangement. The air receiver can be placed in the boiler house, and the boiler tubes cleaned with a hose attachment.

Adequate preparations are to be made for coal storage and a two weeks' supply kept on hand.

In the engine room is placed a vertical air compressor, a generator and a switchboard. The compressor may be of the type supplied by the Peter Brotherhood, Ltd., of Peterborough, England, or its equal, with a capacity of 300 cu.ft. of free air per minute. This occupies a floor space of 3 ft. 9 in. by 6 ft.

The electrical unit is direct current, compound wound, having an output of 20 to 30 kw. at 220 volts, this voltage being chosen because of the ease of obtaining 110-volt lamps in western towns. The power from the generator is divided as follows: 20 hp. for pumps, 10 hp. for saw and 5 hp. for lights. A 40-hp. turbine (Kerr or its equal) is the most economical driving unit and occupies a little more space than the generator.

The switchboard is equipped with one 100-ampere switch, one 50-ampere switch, one 25-ampere switch (all of the double-pole type), one shunt rheostat, one 150-ampere circuit-breaker, and the necessary fuses, etc.

Installed in the hoist houses are two 8x10-in. reversible hoists, with loose drums 4 ft. in diameter, each bolted to a 7x7-ft. concrete foundation. The indicator on these machines should move 1 in. for each 10 ft. of rope travel, and a balanced type of throttle should be employed in place of the one usually supplied by the manufacturers. Signal code and hoist engineer's instructions should be conspicuously posted. A hammer and plate type of gong is a convenient signal appliance to use. A separate bell for the topmen as well as switches for sending return signals through a lamp cluster to

\*Pembina Coal Co., Entwistle, Alta

the sinkers are necessary. No other equipment should be placed in the hoist house.

A little thought proves profitable in equipping the wash room; at all events, it should be fitted with three shower baths, about 50 hooks and chains for the men's clothing, and steam heating coils.

The supply house and its fixtures are often a big question. Having no supplies in the field, it is hard to decide what material and repair parts will be needed for the sinking and construction operations. The following list is therefore given as a basis:

Tools—Round-nosed shovels, clay and miners' picks, steel wedges, 4- to 6-lb. hammers, 8-lb. sledge axes, crow bars, hand saws, crosscut saws, wheelbarrows, monkey and pipe wrenches, steel levels, plumb bobs and line, files, chisels and small mechanics' tools, spare blasting equipment, cant-hooks and a few carpenters' tools, such as augers, wood chisels, etc.

Repair parts—Spare pump fittings and hose, drill fittings, engine fittings, dies for pipe machine and other spare machine parts.

General supplies—Steam and water packings, oils, two or three safety lamps, coal-oil torches, stable lanterns, carbide lamps and carbide, graphite and white lead, gage-glasses, pipe fittings, sheet tin and brass.

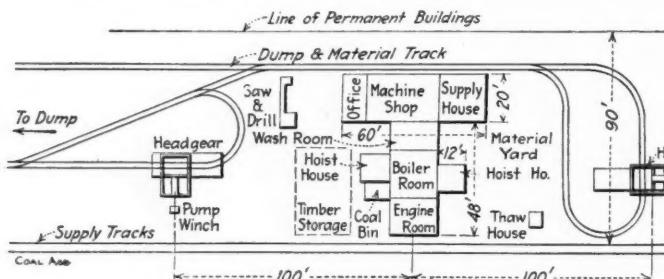


FIG. 1. LAYOUT OF SHAFTS, TRACKS AND TEMPORARY BUILDINGS

babbitt metal, lampwick, waste, iron wire, building paper, 2-in. to 6-in. nails, 1/2-in. to 1-in. manila rope and blocks for same, one 3-ton triplex block.

Stable supplies must also be stocked.

Iron and steel—Various sizes of bar iron, round, flat and square and drill steel.

A line of piping from 1/2 in. to 3 in. and a complete assortment of washers, nuts and bolts are required.

Sufficient oil-skins and gum boots should be stocked. Each man wears two suits which will shed water for about two weeks, if large quantities are encountered.

For the economical handling of the foregoing supplies, bins, shelves and boxes must be fitted in the supply house and convenient racks for piping and bar iron placed alongside this building. A desk and card index system for the use of the warehouse keeper facilitate the handling of the supplies.

Adjacent to the supply house is the blacksmith and machine shop. This is to be equipped with forge, anvil, grindstone, pipe and bolt machine, vise and a hand punch and shear. These tools can afterwards be used in the permanent shop. A 3-hp. gasoline engine or an electric motor will drive these appliances. Benches and cupboards should be installed for the carpenters and for small tools.

In the office there should be a drafting table, a master sinker's desk, two cupboards, a blackboard and a leanto

desk for the shift bosses. A correspondence file and typewriter are necessary if this is the only office in the field.

#### A CONVENIENT HEADGEAR

Passing from this building to the headgear, the type usually built is unwieldy. In Fig. 2, a framework is shown which can be built by the blacksmith and erected over the shaft in a short time, and if necessary it is easily moved as a solid unit. The structure is self-bracing and is large enough to handle a 1-cu.yd. capacity bucket.

A self-dumping arrangement is shown in this figure, which works as follows: On the shaft doors, rails are fitted, and after the bucket is hoisted the doors are closed and the car pushed over the shaft top. The bucket is lowered into hooks and is dumped by the hoisting engineer slackening the cable. The empty bucket is then hoisted and the hooks pulled back out of the way of the crosshead. A good speed of hoisting can be attained by having two or three empties stored upon the tracks.

The tracks from each shaft to the dump are shown

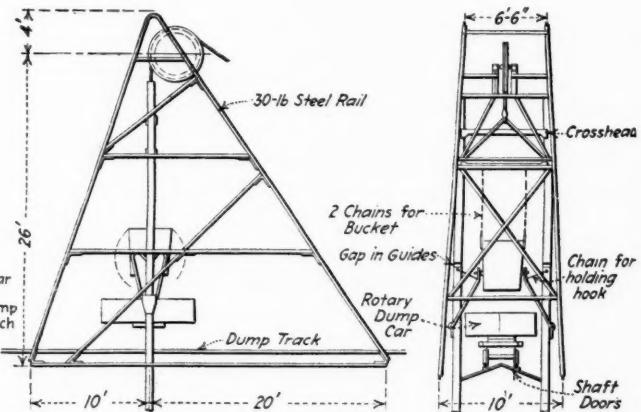


FIG. 2. ARRANGEMENT OF HEADFRAME, HOISTING BUCKET AND DUMP TRACK

separate. By this means, in the event of a derail or trouble with either shaft's dumping arrangement, the other is not affected.

Dump cars of 2 to 2 1/2 cu.yd. capacity are used, and for this size of car, 25-lb. rails are necessary. For a haul of 300 yd., three dump cars per shaft are required. One horse per shift is necessary for each shaft. For these horses a stable must be erected.

A powder house must be supplied sufficiently large to accommodate 50 to 100 cases of explosive. A thaw-house 6x6 ft. has also to be built. It is sunk 3 ft. into the ground and steam heated with the exhaust from the turbine or compressor. Two cases of dynamite can be here stored, arranged in racks for thawing.

In the material yard is set a circular saw and a boring machine for wood working. The timber is so stored that it can be moved, sawed, trimmed and then loaded on a level track leading to either shaft with the least possible handling. With a few conveniences, such as a traveling cradle for use in sawing timbers, four or five carpenters can keep the two shafts supplied with sets.

A ditch to take away the discharge from the pumps is required and has to be figured on along with the other surface arrangements.

From the surface we pass to the shaft equipment.

The formation usually encountered in this district being soft sandstone or shale, churn drills will work well.

Air drills of the shaft-bar type have been tried, but they took too long for setting up and stuck in the holes, causing much delay. It is suggested that drills of the Jack-hamer or Hardy Simplex type are much more speedy. Six to eight of these machines should therefore be purchased, with one or two extra lengths of hose.

For water removal, steam sinking pumps of the Cameron type may be used. Considerable delay, however, is experienced with this type of pump owing to sand and grit wearing away the valves, spindles and packing. As an alternative, two- or three-stage centrifugal pumps may be installed, driven by electric motors or steam turbines.

The pump and driving units are bolted between channel irons having a sheave wheel at the top, around which runs the rope for lowering or raising. A safety chain must be employed to prevent excessive swinging in the shaft. A winch may be placed at the shaft top, separate entirely from the main hoist, to raise and lower the pumps; this is advisable to prevent delaying operations. The suction hose should be of the inclosed-spring type and be marlin or chain wound to prevent cutting by flying rocks or by picks. Immediately above the pump, a hose 50 ft. in length is attached to form a flexible connection to the discharge pipe. This and the suction hose must be equipped with quick-coupling joints.

For lights in the shafts, two four-lamp electric clusters may be used, by the light of which all mucking and drilling operations can be carried on. For timbering, however, as well as for placing packing and lagging, two or three torches are necessary.

For placing the guides, a cradle consisting of a platform swung from four ropes should be supplied. This avoids much trouble in lining up and measuring.

Having thus chosen the equipment, the operation of sinking will be considered.

The first question in beginning actual sinking is the disposal of the men. For this size of shaft, eight men including the shift boss can be used to best advantage.

#### THE SHAFT IS STARTED LARGE

The shaft is started 18x22 ft., thus allowing for a 2-ft. shaft collar. For the first 10 ft., spading the dirt to a platform and then into the car will be the procedure, and with clay soil as usually found this can be continued until a depth of 20 ft. is reached, or until the hardpan upon which the concrete collar rests is encountered. It is seldom, however, that the surface soil will hold back a sufficient time to permit this depth without timbers.

The bearing timbers are then placed, each overlapping the sides of the excavation at least 4 ft. The whole set is lined up with a transit, and where bearing timbers cross one another they are securely bolted. The first shaft set is then swung immediately below this, skin tight to the bearers. Hanging bolts are placed and wrought-iron washers of  $\frac{3}{8}$ -in. or  $\frac{1}{4}$ -in. plate used under the nuts. Cast-iron washers will break and ordinary washers pull through the timbers.

The second and third sets are hung on 5-ft. centers. Posts are put in the corners, buntons placed and center posts set, and the whole structure drawn tight with the hanging bolts. Lagging is then nailed on, the 2 ft. of room outside of timbers permitting this to be done. By means of brackets lined up accurately in place at the corners of the top set, the remainder of the sets are plumbed and wedged to the sides of the excavation, the

surface soil being shored back with planking to prevent caving in. At least three plumb strings are to be used for lining up timbers, for although the sets are trimmed to templates, a slight discrepancy is noticed when notches are fitted together, and this can often be taken out in the plumbing.

Excavation is then resumed until another set of timbers can be placed. This is put in and the operation continued until a sufficient depth of shaft collar is reached, after which sinking is conducted with the neat size of 14x18 ft. below this depth.

The concrete for the collar is poured all around the shaft. Reinforcement is hung vertically on 18-in. centers and concreting continued until the surface is reached. The collar is built at least 2 ft. above surface level to prevent water running into shaft. The hoisting arrangements are now erected and the headgear set on the collar. When this is completed, the sinking is continued, but no blasting should be permitted until the shaft is sufficiently far below the collar so as not to injure same.

For shooting, it will be found most economical to drill eight 6-ft. holes around the sides of the shafts and four 8-ft. sump holes at an angle of 20 deg. from the vertical. More muck can be hoisted and faster footage made with this depth of holes than if they had been drilled 10 or 12 ft. deep. The constant tramping of the men packs the shale so hard that pick work has to be resorted to, and this takes time. When the holes are finished, six men go to the surface, while the shift boss and a helper stay down to charge the holes. When this is done, they go to the surface and the shots are fired. The shaft is then examined, the débris scraped off the timbers and the men resume mucking. When sinking has reached the depth of 100 ft., it is advisable to make preparation for blowing out powder smoke. This can be done when air drills are used, by opening the manifold at the foot of the air pipe, controlling the same with a valve on the surface.

The carpenters should have a set of timbers ready trimmed, lagging sawed to length and wedges and packing handy when the dirt is mucked out the required distance for the timber. This set is then lowered, lined up, wedged and lagged in place. The strata will not usually hold back sufficiently long to enable the timbers to be built up on hitches, therefore sets are placed as soon as sufficient room is made. A clevis should be used in lowering timbers, and a definite method of lowering wall plates, end plates, etc., understood between the shift boss and the topmen. The center bunton is usually left out in the last set of timbers, so that the bucket can be swung to the shaft side.

It is possible with a well trained crew to timber and lag a shaft set in 3 hr., although if large holes are made inside the shaft, the packing of same will take much longer.

Hitch timbers are to be placed every 80 to 100 ft., and if possible these should rest on a hard pan or rock strata. Heavy shots must not be fired immediately below a hitch set, and the shaft set under this should be particularly well wedged and packed.

Water rings are cut in the shaft at every spring encountered, and the water piped from ring to sump, preventing excessive spraying in the shaft. A ring must be placed over the door set leading to the coal seam; this prevents water from traveling back over the entry timbers.

The door set should be 12 ft. in height and one side of the shaft should be beveled off to permit 30-ft. lengths of rail to enter the mine.

NAME OF COMPANY  
Daily Shaft-Sinking Report

		No. 1 Shift	No. 2 Shift	No. 3 Shift	Total
1	No. of holes drilled.....				
2	Depth of holes.....				
3	No. of shots fired.....				
4	Lb. powder used.....				
5	Buckets of muck hoisted.....				
6	Sets of timber placed.....				
7	Time setting timber.....				
8	Gal. of water pumped.....				
9	Time moving pump.....				
10					
11	No. of shift-bosses.....				
12	No. of drillmen.....				
13	No. of helpers.....				
14	No. of muckers.....				
15	No. of carpenters.....				
16	No. of pumpmen.....				
17	No. of topmen.....				
18	No. of dumpmen.....				
19	No. of surface-foremen.....				
20	No. of engineers.....				
21	No. of firemen.....				
22	No. of blacksmiths.....				
23	No. of helpers.....				
24	No. of carpenters.....				
25	No. of helpers.....				
26	No. of laborers.....				
27					
28	No. of ft. depth.....	Total			
29	No. of ft. depth, per shift.....				
30	No. of ft. depth.....	Total to date			
31	Material hoisted.....				
32	Remarks.....				
		Signature of foreman.			

FIG. 3. FORM OF DAILY COST LOG

Before operations in the seam are commenced, sinking should be continued down to the bottom of the sump; this is timbered and the last shaft set placed on the bottom and securely wedged and blocked underneath, so that when the landing timbers are placed upon it, the drop of the cage does not affect it.

A FAIR STANDARD OF SPEED

This gives the general operation, and it is considered good progress if a round of holes is shot, mucked and one set of timbers placed in three shifts.

The estimated number of men necessary for sinking two shafts will be as follows: One master sinker, one clerk, one warehouse keeper, four 12-hr. shift bosses, forty-two 8-hr. muckers, two 12-hr. pumpmen, four 12-hr. hoist engineers, two 12-hr. firemen, four 12-hr. top-men, eight 12-hr. dumpmen, including drivers; five 10-hr. carpenters, two 10-hr. blacksmiths and two 10-hr. laborers.

It is necessary that a good system of cost keeping be

used and followed to prevent excessive expense for labor and supplies.

Forms as shown in Fig. 3 are suitable for keeping these costs and will enable a daily log of the sinking operations to be kept.

ESTIMATED COST OF EQUIPMENT REQUIRED

Boiler House, 20x24 Ft.	\$2,000
Vertical 100 h.p. boiler.....	80
Concrete foundation.....	500
Building and erection.....	120
	\$2,700
Vertical compressor.....	\$1,800
Turbine and generator.....	1,200
Concrete foundations.....	150
Building and erection.....	300
Erection of engines.....	250
	\$3,700
Hoist Houses, Two, 12x15 Ft.	\$3,000
Two hoists.....	100
Foundations.....	300
Buildings and erection.....	
	\$3,400
Wash-House, 12x20 Ft.	\$150
Building and erection.....	200
	\$350
Supply House, 20x20 Ft.	\$300
Building and erection.....	200
Equipment.....	1,500
	\$2,000
Blacksmith Shop, 20x30 Ft.	\$500
Building and erection.....	130
Blacksmith's tools.....	80
Peerless drill.....	30
Pipe threading machine.....	500
Punch and shear.....	70
Shafting.....	50
Motor.....	150
Extras.....	100
	\$1,610
Foreman's Office, 20x10 Ft.	\$300
Building and erection.....	500
Engineering equipment.....	
	\$800
Outside Equipment	
Two headgears.....	\$1,000
Ropes, $\frac{3}{4}$ -in. non-twist.....	500
Dump arrangements.....	500
Tracks.....	500
Dump cars.....	1,000
Stable.....	300
Powder house and thaw house.....	150
Circular saw and motor.....	250
Boring machines.....	100
Gearing, etc.....	100
	\$4,400
Shaft Equipment	
Air drills and hose.....	\$1,600
Two centrifugal pumps with motors.....	2,000
Pump winches and equipment.....	500
Crosshead and cradle.....	250
Water tank or reservoir.....	250
	\$4,600
Summary	
Boiler House.....	\$2,700
Engine room.....	3,700
Hoist House.....	3,400
Wash-house.....	350
Supply House.....	2,000
Blacksmith Shop.....	1,610
Office.....	800
Outside equipment.....	4,400
Shaft equipment.....	4,600
Boarding House.....	1,000
Total.....	\$24,550

Say \$25,000 would be necessary for equipment, and a fair charge to the shafts for this item would be \$8 per foot.

The cost of timber would approximate \$10 per foot, thus bringing the cost of dead supplies to \$18 per foot.

Per Foot

Explosives will cost about.....	\$4
Coal.....	6
Labor.....	50

Making a total estimated cost per foot of shaft of.....

\$78

The accompanying table shows a rough estimate of the cost for equipment and material required for such sinking operations as have been above described. It will of course be understood that local conditions may greatly alter various figures here presented. It is believed, however, that the estimate here given is a fair one and reasonably represents the majority of cases.

# Plant of the Glen Alum Coal Co.

BY W. J. DARLEY\*

**SYNOPSIS**—This article describes the plant in which is installed what is believed to be the longest double-chain retarding conveyor in use at the present time.

Located on a short branch of the Norfolk & Western R.R., about 3½ miles north of Genalum Junction, in Mingo County, W. Va., in one of the most beautiful ravines draining to Tug River, is the newly completed plant of the Glen Alum Coal Co.

Although several distinct coal beds underlie the company's property, only the most promising one is at pres-

As this company has had previous experience with a wooden tipple burning down and throwing the whole operation into idleness the present building is constructed fireproof. The only wood entering into this structure is a few nailing strips, the necessary platforms around the screens and the treads on the stairs. It was considered advisable to employ wood treads, as these give a surer foothold to the workmen than those constructed of steel or iron.

The dump house and entire coal-preparation plant was built by the Scottdale Machine & Manufacturing Co. at its shops in Scottdale, Penn. It was also erected and put in operation under the supervision of this firm's engineers.

## COAL IS NOT PREPARED WHERE DUMPED

The plant consists of a dump house, a retarding conveyor and a screen house in which are shaker screens. One loading boom is at present being installed to handle the lump coal. This was also furnished by the above mentioned company.

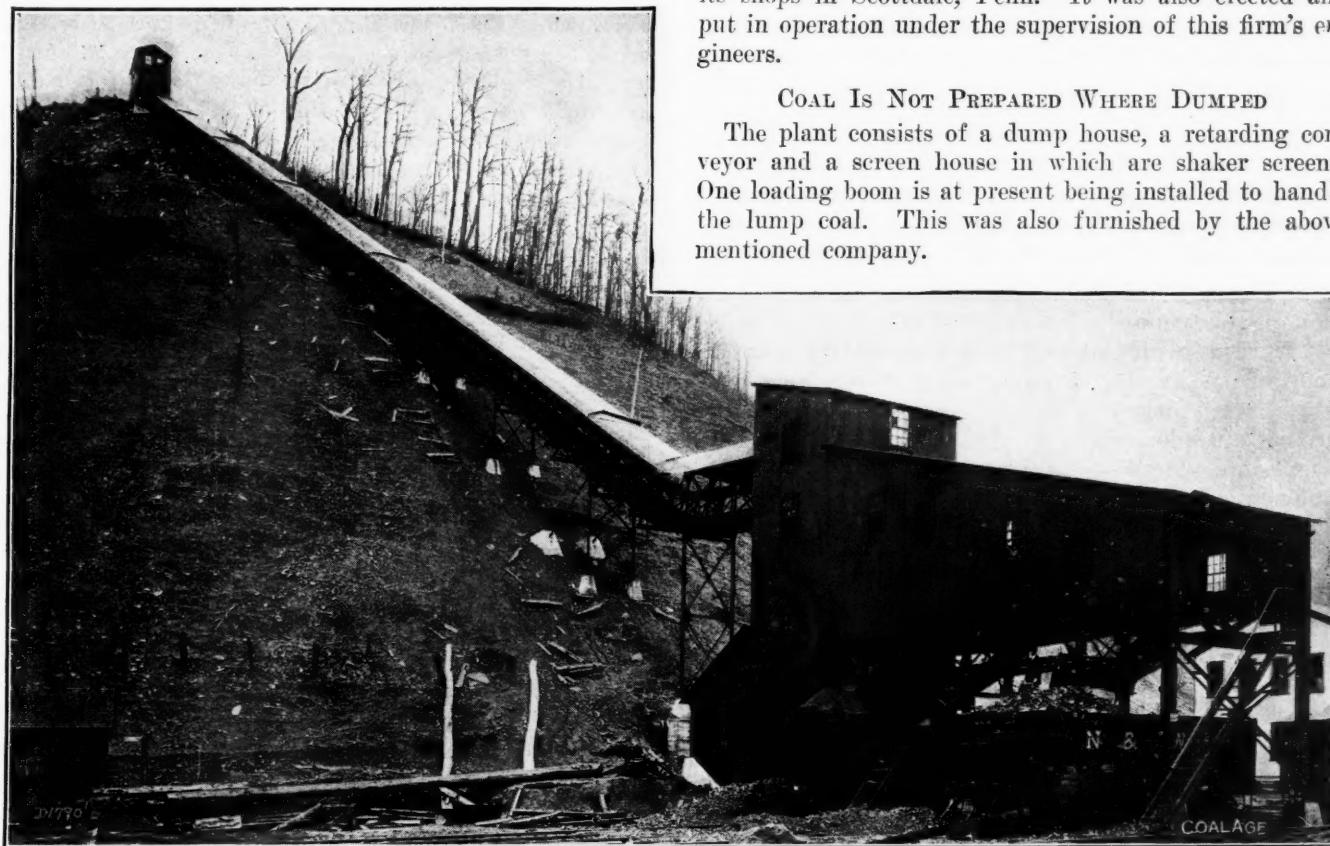


FIG. 1. GENERAL VIEW OF DUMP HOUSE, CONVEYOR AND TIPPLE

ent being worked. This is 6 ft. thick and the outerop on the mountain side has an elevation of 1564.25 ft. above sea level. The elevation of the railroad tracks at the tipple is about 1089.25 ft., so that the coal must be lowered approximately 475 ft. from the coal bed to the coal car.

The coal received at the drift mouth in two-ton cars is transported by Jeffrey locomotives down a tramroad with a 2½% grade which skirts the mountain side for almost a mile to the dump house. Opening the drift mouth almost a mile away from the tipple served a double purpose, first bringing the opening as near as possible to the center of the coal field, and second, in reducing the vertical distance between dump house and preparation plant, consequently lessening the distance which the coal has to travel between the pit cars and the railroad cars.

The dump house is 16x28 ft. in dimensions. It is provided with a 3-in. oak floor, and the structural steel frame is covered with corrugated sheeting. Cars are lowered one at a time from the loaded trip, pass through a kick-back dump and return to the empty track by gravity. The contents are deposited in a hopper of 18 tons capacity, from whence the material is sent to the retarding conveyor by a reciprocating plate feeder making approximately 30 strokes per minute. The length of the stroke may be varied from 2 to 18 in. to suit any desired capacity.

The feeder is driven by a 7½-hp. Westinghouse direct-current motor, which, together with the driving machinery, is mounted in a steel frame made of heavy channels and plates.

The angle of inclination of the retarding conveyor is 30 per cent. and the linear speed 100 ft. per min. The conveyor trough is made up of ¼-in. steel plates, is 3 ft. 2 in. wide and 12 in. deep. The links of the double

\*Scottdale Machine & Mfg. Co., Scottdale, Penn.

conveyor chain are made of  $\frac{3}{4} \times 3$ -in. strap steel containing 0.004 per cent. of carbon. These are joined by  $1\frac{1}{2}$ -in. pins pitched 24 in. apart, upon which revolve rollers 4 in. in diameter with a 2-in. face. Between the two strands of chain thus constructed,  $\frac{1}{4}$ -in. pressed steel flights 36 in. wide and 12 in. deep are spaced 4 ft. apart. A view of the lower end of this conveyor may be seen in Fig. 2.

#### THE LONGEST CONVEYOR OF ITS KIND

While it will be readily conceded that conveyors of the rope and disk or of the monobar type are in existence much longer than this one, it is believed that this is the longest retarding conveyor of its kind in existence, measuring 712 ft. from center to center of the sprocket wheels. The normal capacity of the apparatus is 300 tons per hour, but observations taken on the second day after the conveyor was put in operation showed that this capacity might be increased approximately 65 per cent. Upon this occasion a 50-ton railroad car was loaded with run-of-mine coal in 6 min. without overtaxing the machinery.

The coal is received on the lower strand of the conveyor from the reciprocating feeder above mentioned, and brought down the hill with the least possible breakage and discharged to the shaker screen or to the run-of-mine bypass chutes.

In order to prevent the chain from sliding down the conveyor and possibly wrecking in case the former should break, safety dogs are located every 42 ft. upon the top strand. It is impossible for this part of the chain to run back more than 12 in. before one or all of these dogs automatically take hold, and each one is made sufficiently strong to hold the entire upper part of the conveyor chain.

The dogs are so constructed as to be automatically raised as each roller passes under, but the instant the direction of travel of the chain is reversed the rollers come in contact with and are held firmly by the dogs until the chain can be repaired. The lower portion or "part" of the conveyor travels on  $3\frac{1}{2} \times \frac{5}{8}$ -in. track bars over which is placed an angle-iron guide to prevent the chain from buckling and piling up in case it should break.

#### THE DETAILS OF THE CONVEYOR DRIVE

The conveyor is driven by a 50-hp. Westinghouse direct-current motor, the voltage being 230 and the speed 750 r.p.m. The power is transmitted through three sets of reduction gears, of cut steel, semisteel and cast steel, respectively. The head sprockets are also of cast steel, while the tail sprockets are of cast iron. Each of these carries 7 teeth of 24-in. pitch and are 4 ft.  $7\frac{5}{8}$  in. in diameter. The head shaft is 7 in. in diameter and runs at 6.8 r.p.m. This machinery is mounted on a heavy structural frame which prevents the running parts from getting out of line.

The foundation for the driving machinery required about 275 cu.yd. of concrete, which is anchored to the bedrock by a number of steel dowel pins, which were placed in holes drilled in the rock before the concrete was poured. All of the important foundations for the conveyor were anchored in a like manner.

The frame in which the conveyor is carried is 8 ft. wide and 8 ft. high and is built up of angle trusses 48 ft. 6 in. long. It is covered on top with No. 20 corrugated ingot-iron sheeting, while provisions are made for closing in the sides in the future should this be found necessary. In order to prevent the snow from sliding down the 700-ft. roof of this conveyor and wrecking the screen house, deflectors are spaced about 120 ft. apart, which divert snow or rain water over the sides of the conveyor roof. Steps are provided upon either side of the conveyor throughout its entire length.

#### THREE EXPANSION JOINTS ARE PROVIDED

On account of the extreme length of the conveyor and frame, it was necessary to provide some means of taking care of the expansion and contraction, which amounts to about 3 in. for each 100 deg. change in temperature. The conveyor housing was accordingly made in three sections, the upper end of each being anchored firmly in place, while the lower is allowed to go and come, the joints being made in such a way as to allow the entire structure, including the roof, to move freely for a distance of 2 in. at each expansion joint.

As the coal will naturally pile up behind the flights on a slope of 30 deg. and thus not discharge in an even and constant stream, the lower end of the conveyor was made on an angle of 5 deg. for a distance of approximately 30 ft. This allows the material to distribute itself to

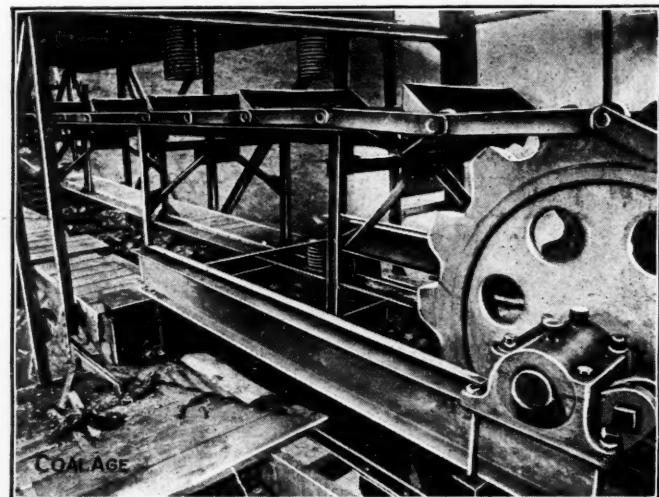


FIG. 2. LOWER END OF CONVEYOR, SHOWING TAIL SPROCKET

an even depth, thus insuring a constant stream into the shakers.

The shaking screens, which are carried on rollers, are 6 ft. wide and double decked, the upper deck alone being perforated. No veil plates are used, the screens being so designed that run-of-mine, lump or a mixture of lump and egg coal may be loaded on the lump track. Similarly, slack and egg or egg alone may be loaded on the egg track, and run-of-mine or slack on the slack track. In order to reach the slack track, however, the run-of-mine is sent through a bypass chute independent of the screening machinery. It is thus unnecessary to operate the screens when loading run-of-mine coal.

#### A SEPARATE STRUCTURE SUPPORTS THE SCREENS

A separate steel frame not connected in any way with the housing or conveyor structures supports all the oscillating parts. This segregates vibration to the supporting structure, there being no possibility of it being communicated to the screen house proper.

The screen motor is controlled by the shaker man, and the conveyor and feeder motors are so wired that by pressing a button he may stop either of these machines. These latter cannot be started again until an electric current in the circuit-breaker is switched on by the shaker attendant. The conveyor should always be started before the feeder, and the motors are so wired as to render any other procedure impossible.

This firm manufactures its own electric energy at a power plant near the old mine about one mile farther up the hollow from the plant in question. The expectation is, however, that a large new power plant as well as a repair shop will be constructed in the near future.

The equipment above described was installed under the direction of Maurice Watts, general manager of the company, to whom I am indebted for the general data above given.

2

### The Increased Coal Output of Arkansas

The production of coal in Arkansas in 1913, according to E. W. Parker, of the U. S. Geological Survey, was 2,234,117 short tons, valued at \$3,923,701, as compared with 2,100,819 tons, valued at \$3,582,789 in 1912, or a gain of 133,288 tons in quantity and \$340,912 in value. The increased production is attributable to a larger railroad consumption, caused partly by a decrease in the sup-

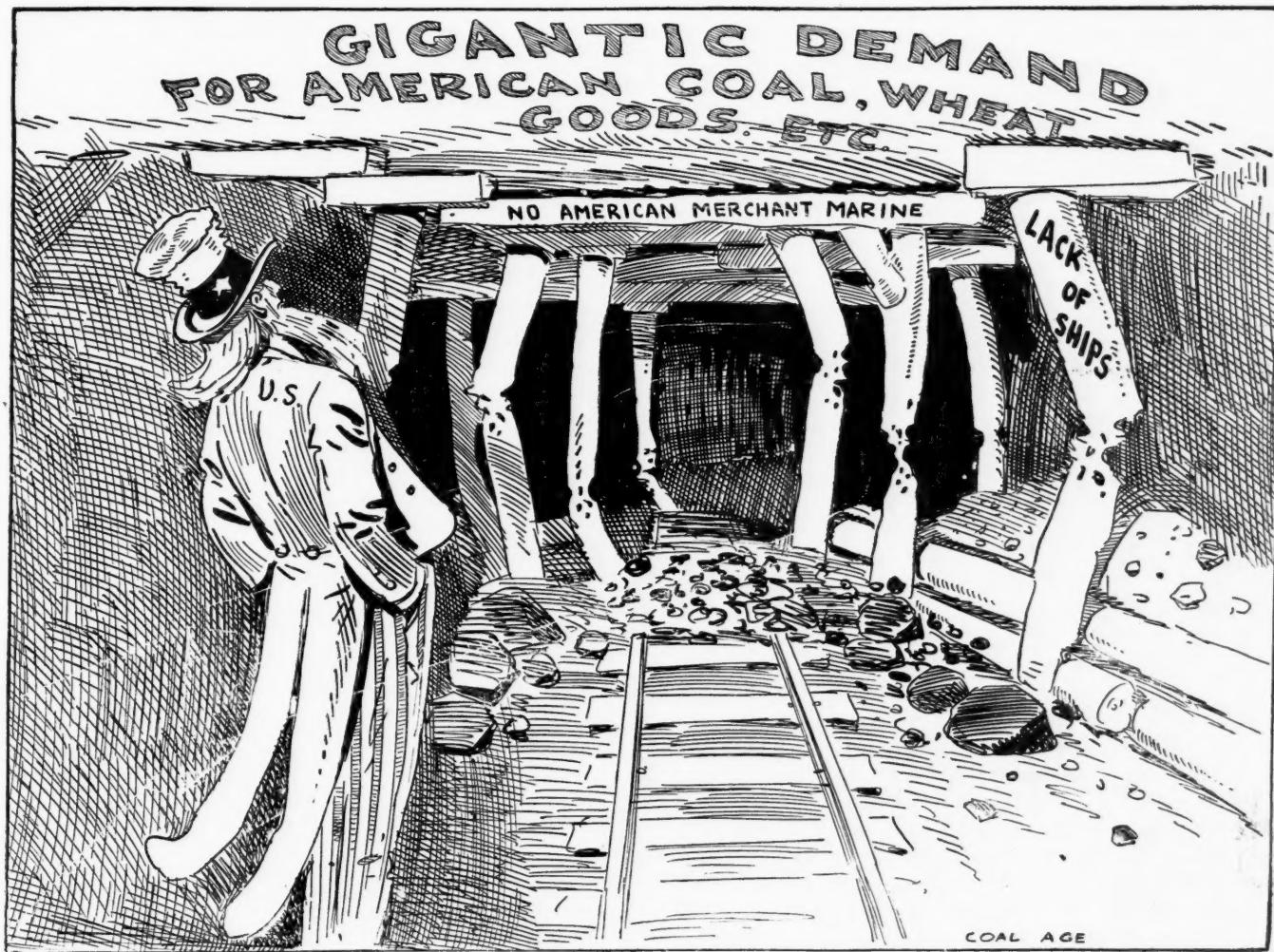
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ply of fuel oil and partly by increased business. This was offset to some extent by decreased domestic consumption, particularly in Texas, owing to an increased use of natural gas in that state.

The prolonged drouth in August and September had an adverse influence on coal production, as it cut down the wheat crop in Kansas and the cotton crop in Oklahoma and Texas. Transportation facilities were improved over those of previous years, and a reduction in freight rates put into effect in the latter part of the year is expected to have a beneficial effect on the industry by enabling larger quantities of coal to be shipped to the Northwest, where Arkansas semi-anthracite has established a market that has already to some extent replaced West Virginia smokeless coal. The conditions at the close of 1913 represented a more hopeful outlook for the future than has existed in Arkansas for several years.

The number of men on strike for one cause or another in 1913 was 1321, or a little more than one-fourth of the total number employed, while the average number of working days lost by each man on strike was 27. The average quantity of coal produced per man was 480 tons, as against 463 tons in 1912. According to the Bureau of Mines there were 12 fatal accidents in 1913, or just double the number occurring in 1912. The death rate per thousand was 2.58, while 186,176 tons of coal were mined for each life lost. In 1912 the death rate was 1.3, and the coal produced for a life lost was 350,137 tons.

2



WEAK PROPS THAT MAY CAUSE A FALL

## The Purchase of Coal on Specifications--II

BY F. R. WADLEIGH\*

*SYNOPSIS—In this second installment, the fallacy of emphasizing the importance of the moisture and volatile content is taken up. Specifications are often exceedingly rigid on these points, when, as a matter of fact, they are either beyond control of the producer or are insignificant insofar as actual heat values are concerned. Ash and clinkers are also discussed, the latter in considerable detail.*

Taking all of the different properties and constituents that may enter into coal specifications, a discussion of the advisability and practicability of their use will be made, eliminating every item not absolutely pertinent. It is hoped in this way to work out contract specifications that are easy to understand, practical in operation and fair to both the seller and buyer.

### MOISTURE

The determination of moisture and its part in coal specification demand careful consideration, as there are some differences of opinion on the subject.

The actual heat loss due to moisture as shown by analysis has often been greatly exaggerated. In the first place, there is nearly always a large possible variation in moisture, which sampling cannot always correct. Next, the coal when it reaches the furnace is almost always drier than when it is unloaded. Then the heat necessary to vaporize the moisture and raise it to flue-gas temperature will lower the percentage heating value of the coal only about 0.1 of one per cent. of the moisture in the coal.

For these reasons, the percentage of moisture allowed in a specification contract should be sufficient to take care of all these various items.

For instance, the contract (290,000 tons) for the coal purchased by the London, England, County Council calls for an allowance of 10 per cent. moisture. In case it runs below this, the quantity of coal paid for is increased beyond the actual weight by a percentage equal to the decrease in moisture; but when the moisture runs over 10 per cent., the amount of coal paid for is decreased in a like manner. Moisture is a factor often impossible to control, as when coal is wet by rain or snow after it has been shipped from the mines.

### VOLATILE MATTER

The volatile matter of coal is made up principally of:

- 1—Hydrocarbons of varying composition.
- 2—A part of the total sulphur.
- 3—Nitrogen.
- 4—Combined water.

It should also be remembered that a part of the volatile matter is noncombustible, the amount ranging from 1 to 15 per cent. of the coal.

Specifying a limited percentage of volatile matter and basing the premiums or penalties on such percentage are only justified where the question of smoke enters in.

The method of determining the percentage of volatile matter in coal is an arbitrary one, and the accuracy of

the result depends largely upon handling conditions. Two different chemists, in different laboratories, both trying to follow the same method, may, according to Sommermeier, easily obtain results differing 2 to 3 per cent. But a good chemist working in a fixed way with the same crucible, same height of gas flame and same burner, can obtain duplicating results within a few tenths of 1 per cent., and the results, on coals of approximately similar nature, should be comparable within 1 per cent.

"White's Gas and Fuel Analysis" says: "Most of the volatile material (evolved from coal) is a decomposition product where the amount varies with the rate of heating, the maximum temperature attained, the character of the flame, the sizes of the crucible and other conditions."

Messrs. Fieldner & Davis, chemists of the U. S. Bureau of Mines, investigating the question of volatile matter in coal, found that using the ordinary water gas at the Washington laboratory gave a maximum temperature of 970 deg. C. inside the crucible. This was 120 deg. higher than they could obtain with Pittsburgh coal gas or natural gas. The conclusions formed from their experiments are as follows:

Two laboratories are likely to vary 2 per cent. in volatile matter, both using the official method (of 1899). The percentage of volatile matter obtained from the same sample of coal varies with the temperature and rate of heating. This is not sufficiently defined by height of flame. Temperatures ranging from 160 deg. C. to 890 deg. may be obtained with a 20 cm. natural gas flame, when the gas pressure is varied from 1 to 13 in. of water; variations of 2 per cent. volatile matter are thus produced. Differences in height and sizes of burner influence results from 0.3 to 1.5 per cent. Polished crucibles become hotter and yield about 1 per cent. more volatile matter than dull gray ones.

Laboratories using natural gas are apt to get results on volatile matter that are considerably lower than those using coal gas, unless the following precautions are observed: (1) Gas should be supplied to the burner at a pressure of not less than 10 in. of water. (2) Natural-gas burners admitting an ample supply of air should be used. (3) Gas and air should be regulated so that a flame with a short, well defined inner cone is produced. (4) The crucibles should be supported on platinum triangles and kept in a well polished condition.

### VOLATILE MATTER IN SPECIFICATIONS

In 1913, the committee on coal analysis, appointed by the American Chemical Society, made its report and recommended the following alternate methods for determining volatile matter in coal. One of these two methods should be specified in all coal specifications where penalties or premiums are enforced on percentage of volatile matter:

It is recommended that for volatile matter determinations a 10-gram platinum crucible be used having a capsule cover, that is, one which fits inside of the crucible and not on top. The crucible with 1 gram of coal is placed in a muffle maintained at approximately 950 degrees C. for seven minutes. With a muffle of the horizontal type, the crucible should not rest on the floor of the muffle but should be supported on a platinum or nichrome triangle bent into a tripod form. After the more rapid discharge of the volatile matter, well shown by the disappearance of the luminous flame, the cover should be tapped lightly to more perfectly seal the cover and thus guard against the admission of air.

One gram of coal is placed in a platinum crucible of approximately 20 c.c. capacity (35 mm. in diameter at the top and 35 mm. high). The crucible should have a capsule cover which will readily adjust itself to the inside upper surface of

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the crucible. The crucible is placed in the flame of a Meker burner, size No. 4, having approximately an outside diameter at the top of 25 mm. and giving a flame not less than 15 cm. high. The temperature should be from 900 degrees to 950 degrees C. determined by placing a thermocouple through perforated cover which for this purpose may be of nickel. The junction of the couple should be placed in contact with the center of the bottom of the crucible. Or the temperature may be indicated by the fusion of pure potassium chromate in the covered crucible (fusion of  $K_2CrO_4$ , 940 degrees C.). The crucible is placed in the flame about 1 cm. above the top of the burner and the heating is continued for seven minutes. After the main part of the gases have been discharged the cover should be tapped into place as above described.

For lignites a preliminary heating of five minutes is carried out, during which time the flame of the burner is played upon the bottom of the crucible in such a manner as to bring about the discharge of volatile matter at a rate not sufficient to cause sparking. After the preliminary heating the crucible is placed in the full burner flame for seven minutes as above described.

The accuracy that should be obtained by a reliable chemist is shown in the accompanying table, taken from the report to the American Chemical Society of its committee on coal analysis, 1913:

	Allowable Variations, %	Same Analyst	Different Analysts
Moisture, under 5%	0.2	0.3	
Moisture, over 5%	0.3	0.5	
Volatile matter, bituminous coals	0.5	1.0	
Volatile matter, lignites	1.0	2.0	
Ash, no carbonates present	0.2	0.3	
Ash, carbonates present	0.3	0.5	
Ash, more than 12%	0.5	1.0	
Sulphur, in coal	0.05	0.1	
Sulphur, in coke	0.03	0.05	

Further, a variation in volatile constituents affects the manner and rate at which the gases are given off during combustion, and two coals varying in volatile content may act in the same manner on distillation in a furnace or coke oven. On the whole, the composition of the volatile matter of coals is so varied and our knowledge of some of the constituents so incomplete that it is advisable, as a general rule, to avoid the use of it in coal specifications.

We must call attention here to the fact that, when considering the effect of volatile matter on combustion, especially with regard to smoke production, it is not always the *quantity* that is important, but also its composition. There is always some incombustible volatile matter in coal, such as carbon dioxide, water and nitrogen, that lowers its heating value; varying percentages of the hydrocarbons also affect the heating value and tendency to produce smoke.

Oxygen in combination is also detrimental to the heat of combustion, diluting and rendering ineffective the equivalent combining weight of carbon, hydrogen or sulphur. According to Dr. David White, oxygen has about the same anticalorific effect that the same percentage of ash would have. He says:

"In other words, with respect to their efficiency as fuels, oxygen is an original impurity in coals, which improve according to the extent of its removal." (U. S. Geological Survey Bulletin, 382.)

#### ASH

The ash of a coal consists of the ash content of the vegetable matter from which the coal was formed and the earthy matter from the strata above, below and in the coal, together with the various substances deposited by water running through the coal seams. Analysis of the ash will yield, in varying quantities, silica, alumina, oxides of iron, lime, magnesia, potash, soda, sulphuric and phosphoric acids.

The following tables give: (1) Ash analyses as show-

ing the variations in constituents of ash; (2) analyses giving also the fusing point of the ash:\*

#### ASH ANALYSIS OF SOME AMERICAN COALS

	Poca- hontas	New River	Reynolds- ville	Fair- mont	Pitts- burgh	Zieg- ler
Silica	37.26	61.26	41.48	36.50	43.95	54.3
Alumina	19.485	24.35	34.68	23.35	39.54	29.1
Oxide of iron	9.21	2.71	18.75	27.58	15.00	9.0
Lime	1.90	0.62	4.38	4.91	1.54	6.3
Magnesia	1.195	1.75	0.12	0.98	....	1.3
Alkalies	....	4.76	....	....	....	....
Sulphuric acid	....	....	0.42	3.92	0.26	....
Phosphoric acid	....	....	....	0.33	....	....

#### COMPOSITION OF ASH AND FUSING POINT OF SOME AMERICAN COALS

Ash in Coal	7.67	4.80	5.49	4.02	8.93	5.40	5.18
$SiO_2$	41.94	42.17	46.55	39.00	49.99	36.80	49.03
$Al_2O_3$	24.04	35.58	35.68	26.21	31.97	31.25	41.98
$CaO$	11.08	4.76	5.00	3.97	2.13	2.80	1.79
$MgO$	1.28	....	1.00	0.67	0.81	Tr.	Tr.
$Fe_2O_3$	14.56	12.70	7.80	21.95	12.23	21.95	5.02
$SO_3$	4.61	3.21	3.76	4.44	0.26	2.76	1.86
Alkalies <sup>1</sup>	0.49	1.68	0.21	3.76	2.61	4.44	0.32
Color	T. C. <sup>2</sup>	T. C. <sup>2</sup>	L. G. <sup>3</sup>	....	L. G. <sup>3</sup>	L. G. <sup>3</sup>	....
Fusing point <sup>4</sup>	2147°	2280°	2350°	2390°	2570°	2640°	3020°

<sup>1</sup>Includes undetermined constituents. <sup>2</sup>T. C. indicates terra cotta. <sup>3</sup>L. G. indicates light gray. <sup>4</sup>In degrees Fahrenheit.

#### CLINKERS

The amount and kind of clinker is of such importance in plant operation that it seems obvious all specifications for coal purchase should contain some provision for handling the question, omitting restrictions as to the firing methods used.

*Ash Analysis*—To analyze the ash is not always practical, for several reasons:

*1st*—It will not tell us with any certainty whether a coal will clinker readily or not, under furnace conditions.

*2d*—Such analysis is too costly and too difficult to make.

*3d*—It is difficult, if not impossible, to get an average sample of the ash.

*Color of Ash*—The color of the ash has often been considered as an indication of its fusibility. A reddish or iron-colored ash was supposed to indicate a clinkering coal, and a white or yellowish color, the reverse. This, however, is not always true, as some coals with a reddish colored ash do not clinker readily and some white-ash coals do.

*Actual Burning of Coal*—This, of course, will always tell whether any coal will clinker, and the nature of the same; but to determine on a standard for specifications from such tests would obviously be impossible.

*Ash-Fusing Temperature. Determination of, as Indicating the Clinkering Property of a Coal*—The formation of clinkers is due to the temperature of the fuel bed reaching the temperature at which the ash will fuse; or it depends upon the fusing point of the ash and the temperature to which it is subjected. This question as applied to coals was first taken up actively on a commercial basis as far as I know about five years ago, the Fuel Testing Co., of Boston, being the pioneers in the movement. This company, in its Bulletin No. 3, published in 1910, on "Clinkers and the Fusing Temperature of Coal Ash," gave some findings and results from its experiments. It had at that time the only laboratory in this country equipped to do this work on coal ash. Since then, a few other chemists have started similar work, and the U. S. Bureau of Mines is now experimenting along these lines, although as yet it has not given out any results, and does not include the ash-fusing temperature in any of the government coal specifications. The value to the consumer of accurate information on

\*Rogers & Auberts "Industrial Chemistry," page 439.

the clinkering of coals can hardly be overestimated, and is of vital importance in steam-plant operation. The amount of clinker made is not of so much importance as is its nature and the temperature at which it is formed. A coal of great purity as regards total ash often has a low fusing point and may make a thin, sticky clinker that is difficult to remove from the grates. This same coal may also have a high B.t.u. value, and yet give unsatisfactory results in burning. It is also a fact that coals with the same amount of ash may have entirely different clinkering qualities.

As a matter of actual fact, the coals that give the most trouble with clinkers are usually quite low in total amount of ash. As the clinker is merely a mass of melted or fused ash, it follows that the ash must have a fusing point at which it begins to melt. If we know this point of fusion and the average temperature to which the ash is to be exposed, we have an accurate means of determining the liability of various coals to clinker under the same furnace and firing conditions.

There is often a great difference in the quantity and quality of clinkers formed from different coals, either from different seams or from the same seam, or sometimes in different shipments of coal from the same mine. Such difference must be due to or dependent upon the temperatures at which the ash of the different coals will fuse.

For further data on the clinkering of coals, see *Engineering News*, Vol. 64, No. 23; *COAL AGE*, Vol. 1, No. 37; Bulletins Nos. 3 and 5, Fuel Testing Co., Boston, Mass.; *COAL AGE*, Vol. 2, pages 862, 111, 218.

In the use of the ash-fusing point in coal specifications, it must be remembered:

*1st*—That the amount of ash fused increases rapidly as the fusing point falls below 2500 deg. F.

*2d*—That with low-fusing temperatures, the character of the clinker is altered, so that more grate-surface is covered per pound of clinker; in other words, the clinkers will run and spread more rapidly and be harder to remove.

Next in importance to buying the kind of coal best suited to the conditions under which it is to be burned is the ash and clinker question, as the amount present seriously affects the efficiency, capacity and operation cost of the steam plant. No matter what kind of coal is bought, low ash means high B.t.u. value, and conversely. It is a dead loss as far as fuel value is concerned, and when present in a certain proportion it makes the fuel useless.

Summing up the bad effects of ash, we have:

It lowers the heating value in the furnace, as its temperature must be raised to that of the fuel bed.

It must be removed at a more or less high temperature, carrying with it heat, together with some combustible, the amount depending upon the grate and furnace design, working of boiler and skill of the fireman.

A greater percentage of ash increases operation costs and decreases the fireman's output of useful work, making this work harder, and causing dissatisfaction.

It decreases possible boiler capacity and efficiency, by clogging up the grates, heating surfaces and furnace settings, thus retarding combustion.

It increases the wear of grates, furnaces and ash-handling apparatus.

The nature of the ash, whether it has a low or high

fusing temperature, and the character of the fused ash or clinkers have more to do with plant capacity and efficiency than any other single element in coal; in fact, more than all the others put together, when considering coals of similar nature.

Knowing the ash-fusing temperature of a coal, we do not need to bother about any analysis of the ash, which at best would only give an approximate idea of its behavior. The ash-fusing determination, on the other hand, gives us definite information which can be embodied in coal specifications and made a basis for payment. To illustrate, two tables of ash-fusing determinations are given below, the first taken from the Fuel Testing Co.'s Bulletin No. 5, on Fusing Temperature of Coal Ash, and the second from my own practice, all of the determinations in the latter, with two exceptions, having been made by the same chemist:

Character of Coal	Fusing Temperature of Ash Deg. F.	Percentage of		
		Ash in Coal	Sulphur in Coal	Iron Oxide in Ash
1. Anthracite . . . . .	3150	14.85	0.76	...
2. Semibituminous . . . . .	3070	14.81	1.36	...
3. Semibituminous . . . . .	2910	7.97	0.96	7.0
4. Semibituminous . . . . .	2880	7.33	0.70	10.0
5. Semibituminous . . . . .	2830	13.85	1.78	...
6. Bituminous . . . . .	2750	10.60	0.60	...
7. Semibituminous . . . . .	2750	5.80	0.71	...
8. Semibituminous . . . . .	2710	7.84	0.96	7.90
9. Semibituminous . . . . .	2680	10.61	1.00	...
10. Semibituminous . . . . .	2640	8.90	1.25	12.0
11. Gas . . . . .	2640	9.84	0.72	6.6
12. Semibituminous . . . . .	2610	8.93	2.14	...
13. Semibituminous . . . . .	2610	8.61	1.29	...
14. Semibituminous . . . . .	2550	12.85	3.10	23.7
15. Gas . . . . .	2520	7.22	1.22	13.0
16. Anthracite . . . . .	2520	10.08	0.61	6.1
17. Bituminous . . . . .	2510	8.02	1.12	...
18. Semibituminous . . . . .	2480	4.97	0.76	...
19. Gas . . . . .	2460	6.91	2.35	24.7
20. Coke . . . . .	2460	9.51	0.80	...
21. Bituminous . . . . .	2450	7.26	0.84	...
22. Semibituminous . . . . .	2440	8.68	3.42	...
23. Bituminous . . . . .	2360	9.30	2.29	...
24. Semibituminous . . . . .	2320	13.06	0.92	7.1
25. Gas . . . . .	2300	6.78	0.98	10.6
26. Bituminous . . . . .	2280	10.47	3.10	...
27. Gas . . . . .	2260	7.25	3.12	34.0
28. Semibituminous . . . . .	2250	7.11	0.73	12.9
29. Coke . . . . .	2190	10.22	1.40	13.9
30. Semibituminous . . . . .	2170	5.50	0.74	...
31. Semibituminous . . . . .	2160	5.70	0.76	...
32. Bituminous . . . . .	2140	21.37	...	...

	Fusing Temperature of Ash in Coal	Per Cent.	
		Sulphur in Coal	Ash in Coal
Semibituminous, Maryland . . . . .	3110	0.91	7.47
Semibituminous, Pennsylvania . . . . .	3000	0.73	4.92
Kanawha Splint, West Virginia . . . . .	2910	0.88	6.05
Semibituminous, West Virginia . . . . .	2820	0.78	3.82
Semibituminous, West Virginia . . . . .	2820	0.72	5.17
Semibituminous, West Virginia . . . . .	2820	0.74	8.15
Semibituminous, West Virginia . . . . .	2750	1.15	6.84
Semibituminous, Pennsylvania . . . . .	2710	1.18	9.81
Semibituminous, Pennsylvania . . . . .	2692	1.23	6.34
Semibituminous, West Virginia . . . . .	2680	0.78	7.83
Semibituminous, Pennsylvania . . . . .	2650	1.18	6.22
Semibituminous, Pennsylvania . . . . .	2640	0.94	8.92
Semibituminous, West Virginia . . . . .	2530	0.91	4.49
Semibituminous, Pennsylvania . . . . .	2500	1.62	7.21
Semibituminous, Pennsylvania . . . . .	2460	2.10	7.45
Semibituminous, West Virginia . . . . .	2410	0.81	4.78
Semibituminous, West Virginia . . . . .	2400	0.79	2.34
Semibituminous, West Virginia . . . . .	2390	0.98	6.34
Semibituminous, West Virginia . . . . .	2370	1.07	3.02
Pittsburgh 1 1/4-in. coal, Pennsylvania . . . . .	2360	0.88	6.19
Semibituminous, Pennsylvania . . . . .	2340	2.55	10.71
Semibituminous, West Virginia . . . . .	2336	1.10	3.05
Semibituminous, West Virginia . . . . .	2320	1.47	6.64
Pittsburgh 1 1/4-in. coal, Pennsylvania . . . . .	2320	0.96	6.84
Semibituminous, West Virginia . . . . .	2300	0.87	2.66
Semibituminous, West Virginia . . . . .	2280	0.91	2.46
Semibituminous, West Virginia . . . . .	2280	1.56	4.44
Semibituminous, West Virginia . . . . .	2270	1.29	5.53
Semibituminous, West Virginia . . . . .	2250	0.78	2.12
Semibituminous, West Virginia . . . . .	2250	0.78	4.97
Semibituminous, West Virginia . . . . .	2230	1.25	4.19
Semibituminous, West Virginia . . . . .	2170	0.66	7.35
Semibituminous, West Virginia . . . . .	2170	1.00	3.91
Pittsburgh screenings, Pennsylvania . . . . .	2140	1.16	11.91

To apply these figures of ash-fusing temperatures to actual furnace temperature determinations, we give the following figures showing observed furnace temperatures:

Coal	Furnace Temperature <sup>1</sup>		
	Average	Highest	Lowest
High volatile (53 tests).....	2470	2864	2091
Low volatile (12 tests).....	2435	2785	2059

<sup>1</sup>Degrees Fahrenheit.

All of the above temperature observations were taken at the rear of the combustion chamber, with a Wanner optical pyrometer, and are therefore probably lower than the actual temperatures, especially with low-volatile coals and when running with low boiler capacity. With low-volatile coals also the hottest point will be closer to the grates.

Clinkers are the *bête noire* of the power-plant operatives; a badly clinkering coal will add 50 per cent. to the labor of the fireman and discourage any efforts at economical firing. It may be said, however, that clinkering is often due to the misguided or careless methods of the fireman himself, when he allows his fire to burn in holes and uses the slice bar continually raising the clinkers on the grates to the hottest zone of the fire and lowering the greatest heat down to the grates through holes in the fire.

x

### Extracts from a Superintendent's Diary

It is discouraging to think of the amount of trouble that two or three miners with a grouch can stir up if they are possessed of a little imagination and go about the task with enough determination. I remember an instance where they nearly shut down a mine by systematically stealing powder from their "buddies" until everyone had become disgusted by the annoyance and threatened to move to another camp. Almost the same result was achieved by swapping miners' checks on the tram cars, only this resulted a little more seriously as several of the victims resorted to fist fights before they found out that the ones whose weights were running long were profiting innocently.

Just now we are taking part in a bitter dispute with one of the railroads that uses our coal for passenger locomotive service because some of our men, for reasons best known to themselves, have been sending out cars half loaded with rock so cleverly topped that they have passed through the tipple without being noticed.

Eventually it will transpire that the two or three men who are at the bottom of this planned the ruse very carefully, even to choosing a critical time when the particular railroad effected would be sure to receive the coal intended for them. And if we succeed in placing the blame we can only discharge the offenders.

The motive department of the railroad notified our general office that several of their passenger locomotives had "gone dead" because of inferior coal received from our mine and demanded an immediate inspection of our entire plant and loading facilities. They would welcome an opportunity to cancel our present contract, since the price of coal is lower now than it was when the contract was made. The plotters were probably aware of that fact also.

During the next few days while everything about our tipple is inspected, each one of our weigh-bosses, dumpers, slate pickers and car trimmers will perform his task with fear and misgiving, knowing full well that a shut down at the present time means short rations for all to say the least.

Their anxiety is not without foundation; during a sim-

ilar dispute with a railroad several years ago I learned that it is not an easy matter to uphold the mine's side of a controversy where quality of coal is the cause of complaint, because although it would seem easy enough to describe quality of coal accurately in a contract, as a matter of fact it is almost impossible to choose words that will prove binding if one of the party really desires to renege.

And to think that this sea of troubles can probably be traced back to some inexcusable misunderstanding originating in a short word passed between a commissary clerk and one of the miner's daughters, or to a gruff answer from a check clerk to a miner who thought he had a certain amount on the payroll when in reality he had nothing.

There's one consolation, however, in all this grim performance, and that is we will get rid of the guilty parties, because even if we don't succeed in finding them out they won't be able to resist for long the temptation to crow to some of their "buddies" about what they did. That's better than having them around indefinitely with a festering grudge, liable at any time to incite our entire community into a strike.

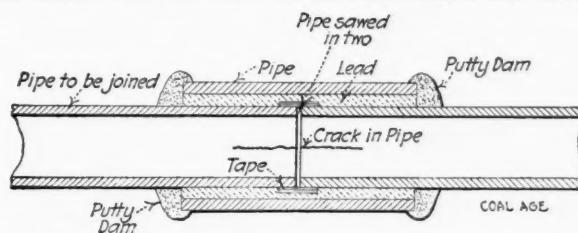
### Repairing a Split and Dented Pipe

By N. G. NEAR

The repair of a broken, split or badly dented pipe may not be a serious problem provided the injured portion is accessible.

Recently a pipe under my supervision got a severe jam, cracked lengthwise and leaked badly. No amount of wrapping with cloth or tape proved effective, and it was evident that some other means would have to be taken to stop the leak.

Accordingly, I sawed the pipe in two at the break, and forced out the dent which had caused the metal to



CROSS-SECTION OF PIPE, SHOWING METHOD OF REPAIR

split. I then slipped a short section of larger pipe over the break, carefully taped the sawed ends of the pipe together, placed the pipe section in a central position with regard to the break, puttied up the ends and poured lead into the space between the pipe and the covering section.

The method of procedure may be clearly seen in the accompanying drawing. The entire process did not require any great length of time and so far as leakage is concerned, there is no sign of a break. While a joint of this kind can be regarded only as an emergency repair, its strength and efficiency are nevertheless surprising.

Electricity may be transmitted through any substance, though in widely varying degrees. The conducting power of any material depends largely upon its physical state. For instance, the conductivity of air decreases rapidly as the pressure increases, while rarified air makes a fairly good conductor of electricity. The conductivity of all substances varies decidedly with change of temperature.

## Two Reliable Mine Pumps

**SYNOPSIS**—*Two compound pumps, each weighing 85 tons, that have been handling 3500 gal. of water per minute, 24 hr. per day, practically ever since their installation in July, 1908.*

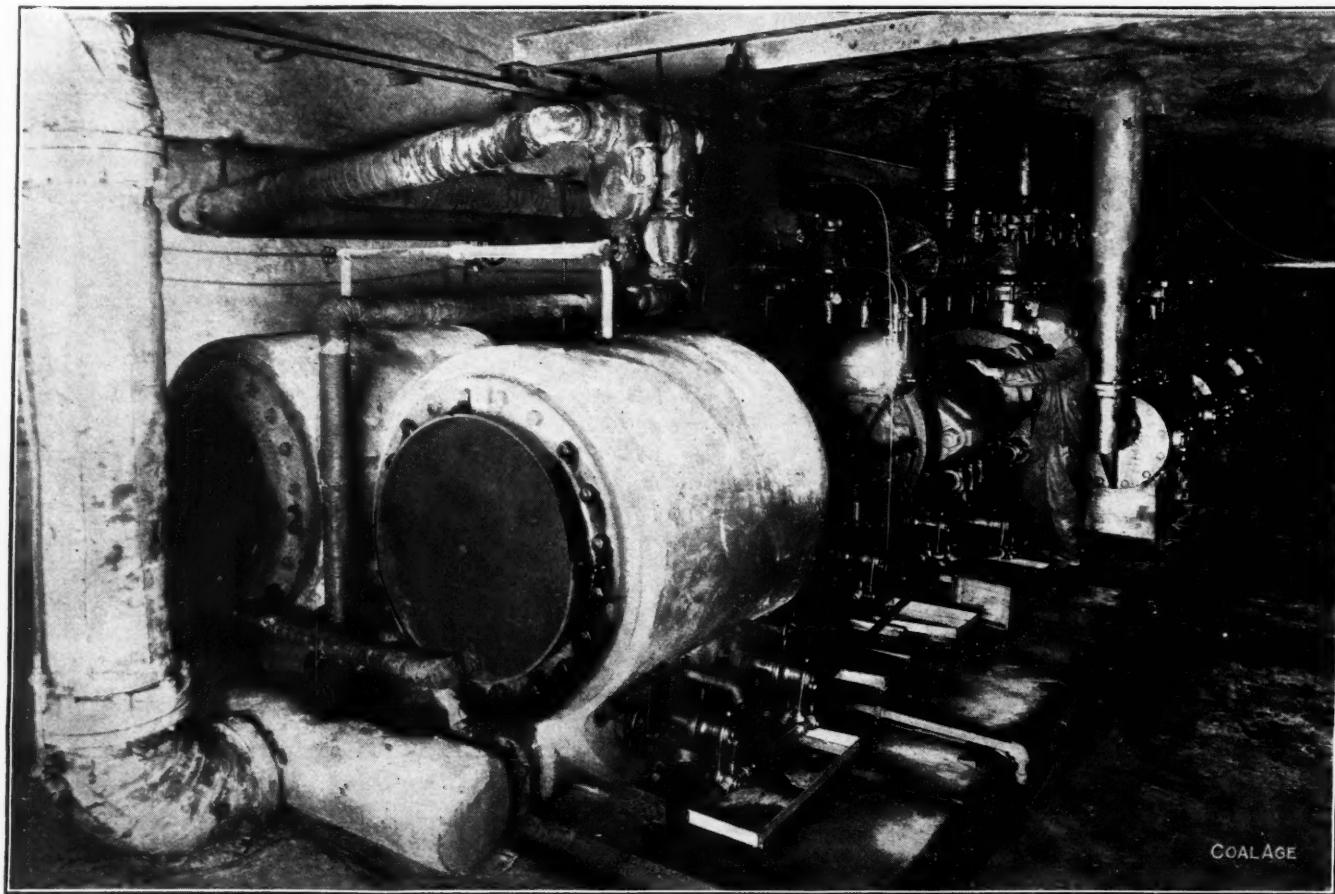
Few people not familiar with the business of coal mining realize the magnitude of the side issues that must sometimes be met. Dewatering a mine may be said to have no direct bearing upon coal digging, yet it frequently happens that unless the water is removed from an operation as rapidly as it enters, the production of coal ceases. In some instances the amount of water pumped or bailed

Each of these machines is 41 ft. 3½ in. long over all, 13 ft. 1½ in. wide and 11 ft. 3 in. high to top of air chambers.

These pumps are placed end to end, in an underground pump house. The water ends are adjacent to each other, so that the two suction pipes lead direct to a single sump into which the mine water drains by gravity.

### EACH PUMP WEIGHS 85 TONS

Each machine weighs approximately 85 tons and the capacity of each is 5000 gal. per min. The high- and low-pressure steam cylinders are 19 in. and 36 in. in



THE TWO PUMPS AS THEY APPEAR AT WORK UNDERGROUND

from the workings is many times the coal tonnage secured.

It will be recalled that the first successful steam engines ever built were mine pumps employing a walking beam and long vertical pump rods. While the English have tenaciously clung to a form of machine wherein the power-generating element is on the surface and the pump proper underground, the two being connected by vertical rods working in a shaft, Americans have developed a type wherein the steam and water elements or "ends" are in close proximity, the steam piston rods being rigidly connected to the pistons or plungers of the pump.

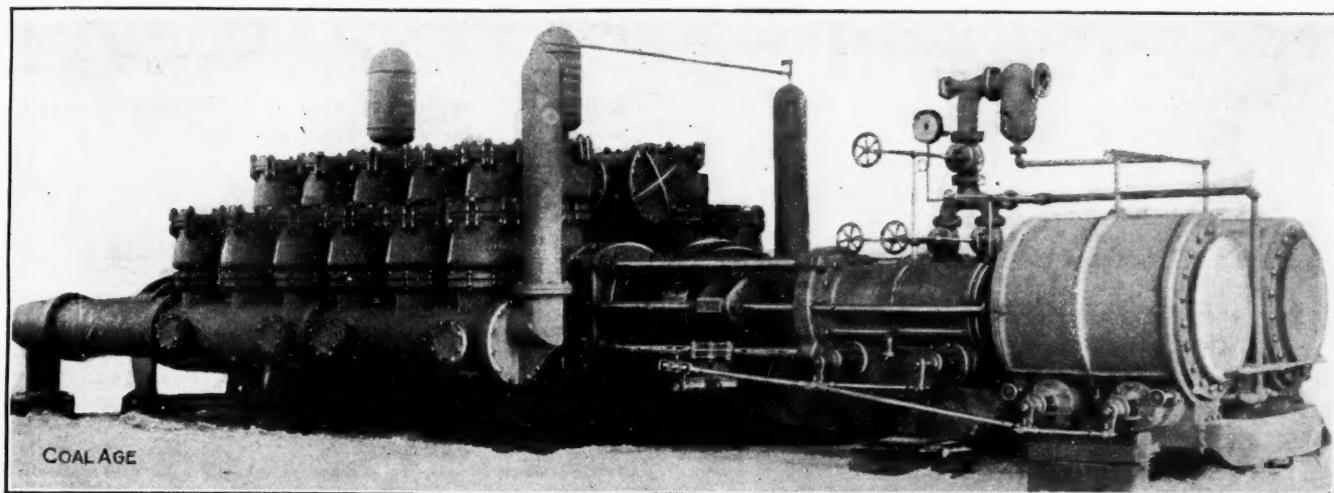
In the Jermyn mine of the Delaware & Hudson Coal Co., located at Jermyn, Lackawanna County, Penn., there are installed two compound duplex plunger pumps built by the Scranton Pump Co., of Scranton, Penn.

diameter, respectively. The plungers are 21 in. in diameter and the stroke is 36 in. The suction pipe is 21 in. in diameter and the discharge is 18 in. The vertical head against which these pumps work is 300 ft.

Steam, which is carried at the boilers at 120 lb. pressure is conveyed to the pumps through piping 350 ft. long. The steam admission opening of each pump is 5 in. in diameter, while the exhaust from the low-pressure cylinder is 10 in. in diameter.

Exhaust from each unit is made to a 12x18x18-in. single independent all-bronze jet condenser, about 6000 lb. of bronze being used in each of these machines, which were also built by the Scranton Pump Co.

Two semirotary steam valves are placed at the bottom of each steam cylinder. These strongly resemble the ordinary corliss valve, but of course are given a



ONE OF THE PUMPS ON THE ERECTING FLOOR

positive motion by the valve-rods. Furthermore, each valve serves both for admission and exhaust. The seats within which they work are bushings with milled ports. These seats are pressed in and doweled, but may be easily removed and renewed should necessity therefor arise. The low-pressure cylinder and both of its heads are jacketed with the drain from the eliminator.

The water end of each pump is provided with 24 bronze pot-valves working on gridiron bronze seats. These machines are believed to be the only ones now in use in the anthracite region supplied with this number of valves.

#### WATER-BARREL EXTENSIONS ARE EMPLOYED

These pumps embody an improvement upon ordinary pump design in the form of water-barrel extensions. Instead of lengthening out the water barrels to accommodate the 24-pot chambers and using an intermediate flange which acts as the wall partition, the barrels are made for the accommodation of only 16 pots and an elbow in the form of an extension is bolted to each barrel to which the remaining pots are secured. A small blind flange is fastened between each pair of elbows with four bolts and is doweled in place.

In making repairs or inspections, it is only necessary to knock out two dowel pins and remove four bolts, and

the partition flange may be taken out. Removal of this flange allows the disengagement of the male and female connection between the barrel and the extension, and either extension or either barrel may be removed, together with the attached valve-pots or other parts, without interference with the balance of the pump.

The entire water end, so far as possible, is wood lined. Where this is impracticable, bronze lining is employed. The steam and water ends are connected by four 3 3/4-in. steel rods upon each side. These are shouldered and provided with split collars to facilitate repairs.

As stated above, the capacity of each pump is 5000 gal. per min. Under ordinary circumstances, however, they are run at reduced speed and each handles about 3500 gal. per min. 24 hr. per day. They were installed in July, 1908, and have been in practically constant operation ever since, which speaks well for their design and general "dependability."

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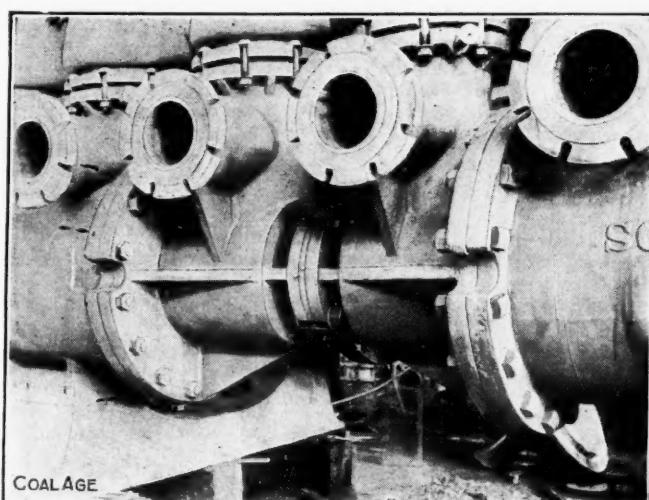
#### Mining Coal in China

The wages paid to coal miners in China are very small compared with those paid in European and American countries, being approximately as follows:

Foremen of mines, and coolies...	\$10.00 to \$17.50 per month
Mechanics .....	7.50 to 22.50 per month
Miners .....	12c. to 20c. per day
Coolies .....	6c. to 14c. per day

The low standard of skill counteracts much of the economy of the low wages in China, for the following reasons: (1) Greater amount of direction and supervision is necessary; (2) greater waste of material; (3) more ground has to be kept open for accommodating a larger number of men, which increases the cost of repairs; (4) more time taken in lowering and raising a larger number of men in and out of the mine; (5) want of ability to take care of themselves in an emergency, whereby the accident rate will naturally be high.

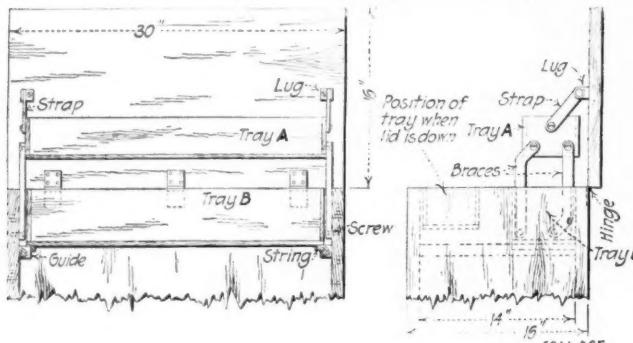
The cost of production at the pit's mouth in China, without considering interest and redemption of capital, is \$1.25 to \$1.50 per ton of coal. The miners are generally respectful and faithful to their superiors; they will work in narrow and badly ventilated, as also badly supported workings, and accept their lot cheerfully. They have a lack of thrift and thought for the future, and amuse themselves by attending theaters and gambling.



THE TWO WATER-BARREL EXTENSIONS AND PARTITION FLANGE

## A Convenient Tool Box

A novel arrangement of tool-box trays has been introduced by C. C. Payton, of the Republic Iron & Steel Co., Sayreton, Ala. This consists in arranging one tray to rise and fall with the tool-box cover. The other tray is arranged to slide backward or forward in the ordinary manner. The arrangement and operation may be readily



SIDE AND END VIEWS OF TOOLBOX

understood by reference to the accompanying drawing.

The advantage of this tray arrangement is obvious, since upon raising the cover the contents of the entire tool box is immediately accessible.

## Don'ts for Foremen and Assistants

**Don't forget that your position and responsibility demand strict sobriety, and do not hire or allow to remain in your employ any subordinate official addicted to the use of liquor.**

Don't forget that you have charge of all matters pertaining to ventilation.

Don't forget to post a notice at the fan engine house, stating the number of revolutions per minute the ventilator shall run.

Don't fail to have every working place examined at least once each day, and if practicable have a second examination made.

Don't fail to direct that the duty of the safety inspector is to look only after the safety of the employees during working hours, and that he is not to relieve the assistant foreman or fireboss of any of his duties.

Don't fail to have a report from each safety inspector every day, and if for any reason he is given other duties to perform, see that a competent person is put in his place.

Don't fail to read carefully the daily report of each assistant mine foreman, fireboss and safety inspector not later than the following day.

Don't fail on your daily inspection tours to see that General Rule No. 12 of the mine law is being complied with and that props are placed and fastened securely.

Don't fail to examine at least once a week all accessible parts of every abandoned portion of the mine in which explosive gases have been found, and immediately remove all dangers existing therein.

Don't fail to examine or see that daily examinations are made, in old sections of the mine being reopened, notwithstanding that these workings were formerly considered nongaseous.

Don't forget that thorough and efficient examinations and inspections before accidents bring better results than the same work after an accident.

Don't forget that we expect you to help us educate the employees to take care of themselves, and this can be best done by personal instruction and attention.

Don't wait for the general inspector to point out dangerous conditions.

Don't fail to take every precaution to insure the safety of the workmen in any portion of the mine that is dangerous or unsafe, and if necessary, withdraw all persons except those required to remove the danger.

Don't fail to see that every person is properly checked out of the mines, or accounted for, before you leave.

Don't allow a light other than a locked safety lamp to be used in any working approaching a place where there is likely to be an accumulation of explosive gases.

**Note—**Taken from Susquehanna Coal Co.'s book of instructions.

Don't allow anyone, except a duly authorized person, to have in his possession a key or any other contrivance for the purpose of unlocking any safety lamp in any place where locked safety lamps are used, nor to carry matches in said part of mine.

Don't fail to have an examination made before a blast is fired in a district where locked safety lamps are used.

Don't forget that whenever a place is likely to contain a dangerous accumulation of water, the workings approaching such place shall not exceed 12 ft. in width and that bore-holes shall be constantly kept in advance.

Don't fail to have an empty trip hoisted in any shaft or slope where the engine has been standing idle for one hour or more before men are hoisted or lowered.

Don't allow any person to ride upon any loaded car, cage or gunboat in any shaft slope or plane.

Don't allow more than 10 persons to be hoisted or lowered at any one time in any shaft or slope, unless more are allowed by the mine inspector.

Don't allow an accumulation of gas to be removed by brushing where it is practicable to remove it by brattice.

Don't fail to have investigated at once any dangerous conditions reported to you by the officials or workmen.

Don't fail to impress on the miners the importance of reporting any misfire, and after doing so, they shall go home for the day.

Don't fail to have safety holes made at the bottom of all slopes and planes and be kept free from obstructions.

Don't allow employees to travel on any slope or gravity plane while cars are being hoisted or lowered thereon.

Don't employ any person in a mine or section of a mine evolving explosive gases who is not competent to understand the rules and regulations.

Don't forget that not more than 75 persons shall be employed at the same time in any one current or split of air.

Don't fail to have all doors used in assisting or in any way affecting the ventilation hung and adjusted so that they will close automatically.

Don't fail to see that all main doors shall have an attendant, unless a self-acting door is used which is approved by the inspector of the district.

Don't fail to have all main doors so placed that when one door is open, another shall remain closed.

Don't fail to have an extra main door so placed and standing open, so as to be out of reach of accident, and so fixed that it can be at once closed in the event of an accident to the doors in use.

Don't fail to provide a substantial fastening for securing the door while being opened to pass the trips.

Don't fail to have the framework of all main doors substantially secured in stone or brick, laid in mortar or cement, having sufficient clearance between the car and frame on one side.

Don't fail to ascertain, once a week, the quantities of air in circulation, and enter same in the colliery report book.

Don't allow face of breast to advance more than 60 ft. beyond heading. Drive new heading.

Don't neglect to have a heading driven at the face of each breast when finished, to prevent an accumulation of gas.

Don't fail to enter in your report any danger observed in making your examination as required by law.

Don't fail to see that all dangerous or abandoned places in the mines are properly fenced off across the opening so that no persons can enter, and that danger signs are posted.

Don't fail to withdraw men immediately from affected portion of mine in case of accident to a fan.

Don't allow any miner or other person to carry matches where it is necessary to use locked safety lamps.

Don't fail to see that locked safety lamps are used when any others would be a menace to life and property.

Don't fail to see that all safety lamps are properly locked when used in gaseous districts.

Don't permit drill bits to be used unless at least one-eighth (1/8) of an inch larger than the diameter of the cartridge in use.

Don't fail to have doors and stoppings constructed as required by the mine law.

Don't forget that all gangways and main haulageroads driven hereafter where employees travel shall have a clear space of two and one-half (2 1/2) feet from top of car to rib, and also to timbers, always on one side if conditions permit. Otherwise, provide ample safety holes on same side. Both to be always kept clear of obstructions.

Don't fail to keep the distance between prop and top rails of cars used in bcasts at least three (3) feet, and space kept free of obstruction.

Don't allow platform, where used in gangways, to extend over top rail of car.

Don't allow chutes to extend more than twelve (12) inches over top rail of car unless they clear top rail at least sixteen (16) inches.

Don't neglect to remove or saw off all the chute or platform when a breast is finished or abandoned.

Don't forget to have examined, each working day, the shafts, slopes, travelingways, etc., as required by the mine law.

Don't fail to provide miners with a sufficient number of sawed up cap pieces of suitable size.

Don't fail to insist that the miner remain at work with his laborer, and do not allow the laborer to remain at work without the miner.

Don't fail to provide special cars in slopes for lowering and hoisting men.

Don't fail to direct and see that efficient safety blocks or devices are placed and maintained in good working order for preventing cars from running into shafts, slopes or planes where used by employees.

Don't fail to see that all hoisting ropes, safety catches, chains or bars, and all other hoisting apparatus are inspected, cones readjusted and bridle chains annealed.

Don't fail to observe the law relating to sinking new shafts.

Don't fail to have all permanent structures inside fire-proof, including permanent air bridges.

Don't fail to correct any man you may see handling or using explosives in a faulty manner.

Don't fail to place danger signs when you find gas.

Don't keep a miner in your employ who opens a keg of powder with a pick, or who tamps his charge with an iron drill or needle.

Don't use, or allow to be used, open lights for testing brattice or stoppings for leakage.

Don't fail to notice any dangerous conditions when entering a working place, especially the "top."

Don't employ a man for work with which he is not familiar without giving him instructions, and also call his attention to the rules relating to his work.

Don't fail to keep mine telephones and signals in working order between the surface and all important parts of the mine.

Don't fail to instruct all persons in your employ to close all gates in shafts and slopes.

Don't fail to put up signboards indicating the direction of outlets to the surface.

Don't permit the storage of hay where the smoke may be carried into the main intake in case of fire.

Don't ride or permit others to ride on motors except for the purpose of making an examination.

Don't fail to observe the law governing the qualifications and duties of hoisting engineers.

Don't allow any person in a state of intoxication to enter any mine.

Don't fail to report all accidents as quickly as possible.

Don't fail to have an efficient alarm attached to the front end of every trip pushed by a motor.

¶

### Alabama Rate Increase

Following in the wake of the 5 per cent. increase in freight rates granted the Eastern lines, the Southern railroads, operating out of the Birmingham district, have petitioned the Alabama Railroad Commission and the Interstate Commerce Commission to be allowed to increase their freight rates on coal to practically all points in Mississippi, and some in Alabama, Tennessee and Louisiana, 10 to 33 per cent.

From the standpoint of both the Alabama operator and the consumer, this is one of the most important matters ever presented to these bodies; to the operator because it will undoubtedly reduce his territory, which has gradually grown smaller year by year, due to excessive freight rates from this district and more advantageous rates from other districts; and to the consumer because, should he be situated where he cannot get coal from another district, he must stand the additional freight.

It is a well known fact that Alabama in recent years has lost practically the entire state of Georgia, due to the low rates from Tennessee, Virginia and West Virginia, and now the railroads, instead of coming to the

assistance of the operators, are asking that they be allowed increases in their rates that will still further curtail the Alabama production. What is true of the territory east of Birmingham, just mentioned, also applies to that north and west. Northern Alabama, on the edge of the Alabama coal fields, gets most of her coal from Tennessee, due to the already too high freight rates from the Birmingham district. Mississippi, just west of these fields, gets most of her fuel from Illinois and Kentucky, for, notwithstanding the fact that the distance is at least 50 to 75 per cent. greater from Kentucky and Illinois fields, the freight rates to practically all Mississippi points are the same from Illinois and Kentucky as from Alabama. And yet the railroads request that they be allowed to raise their Alabama rates.

There are contracts now with Alabama operators amounting to hundreds of thousands of tons of coal from the railroads traversing the Atlantic seaboard, and should the freights be raised, these contracts would be placed in Tennessee or West Virginia. This also applies to the lines in the Mississippi Valley, as they will probably draw their fuel supply from the Illinois and Kentucky mines.

While the proposed rates cover practically all points, a few of the most important are as follows:

To:	Present	Proposed	To:	Present	Proposed
Birmingham, Ala....	\$0.30	\$0.40	Memphis, Tenn....	\$1.10	\$1.25
Birmingham, Ala....	0.40	0.50	Columbus, Miss....	0.95	1.10
Anniston, Ala....	0.50	0.70	Gulfport, Ala....	1.25	1.40
Gadsden, Ala....	0.50	0.70	Jackson, Ala....	1.45	1.60
Alabama City, Ala....	0.50	0.70	Meridian, Ala....	1.10	1.25
Sylacauga, Ala....	0.50	0.70	Natchez, Ala....	1.55	1.70
Attalla, Ala....	0.50	0.70	Vicksburg, Ala....	1.45	1.60
Talladega, Ala....	0.30	0.70	West Point, Ala....	0.95	1.10
New Orleans, La....	1.25	1.40			

The Chamber of Commerce of Birmingham has taken the matter up, as well as the Alabama Coal Operators Association, and is preparing to make a strong fight at the hearing before the Alabama Railroad Commission, on Sept. 16.

It is estimated that should these increases be allowed, the Alabama production will be curtailed 10 to 15 per cent. annually.

**Hungarian Coal Industry in 1913**—Despite the unfavorable condition of industries in general, 1913 was a good year for the coal-mining industry, owing in part to the greater demand for coal by the Royal Hungarian state railways. There was a slight increase in the imports of hard coal, briquettes and coke and a decrease in the imports of brown coal. The total imports of brown coal, coke, hard coal and briquettes amounted in 1913 to more than 5,200,000 tons, against 4,870,000 tons in 1912. Exports of these articles in 1913 amounted to slightly more than 390,000 tons, a decrease of about 40,000 tons from 1912. The production of Hungarian coal mines in 1913 is estimated at 10,568,000 tons. Hungarian coal deposits are estimated to contain over 350,000,000 tons in sight, plus available resources of 1,358,000,000 tons.

The coal mines owned and operated by the Hungarian Government have not been profitable. The balance sheet of the Vodnik coal mine showed a net loss of \$82,215 at the end of 1911 and of \$129,920 at the end of 1912. The books of the Komlo coal mine, likewise operated by the Hungarian Government, showed at the end of 1911 a net loss of \$25,578, and at the end of 1912 a net loss of slightly more than double that amount. Other mines owned and operated by the government have also been operated at a loss. It is estimated that the net loss to the government on all the coal mines it owns and operates will be at least \$300,000 in 1914.

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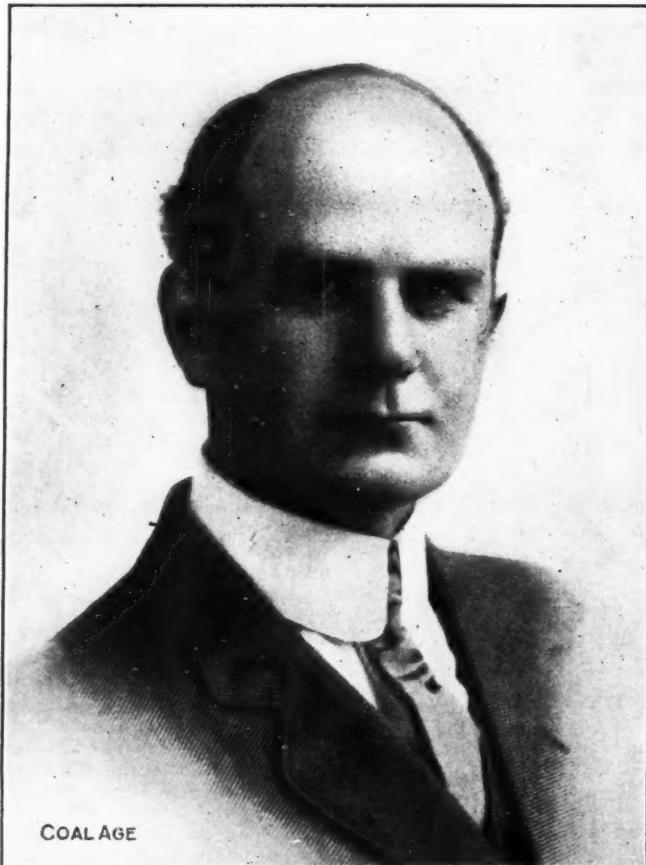
Pure copper possesses many physical properties of great engineering value in addition to its high electric conductivity. It has, to a marked degree, the qualities of malleability and ductility, which make it an ideal metal for wire drawing. Its strength and hardness are greater than that of any other base metal, except iron. It has the power of resisting oxidation, takes a high polish, is easily worked, and can be forged easier than iron.

## Who's Who in Coal Mining

### George Watkins Evans

Coal mining in the Northwest is becoming quite an industry, and in keeping with the progress of the business itself, a number of engineers are advancing to positions of prominence in the great industrial life of our Pacific Coast country. One man who has rendered valuable services to the fuel industries of Washington and neighboring states is George Watkins Evans, consulting mining engineer of Seattle.

Mr. Evans was born at Abercarn, South Wales, in 1876. He comes of a line of coal-mining men, all of



COAL AGE

GEORGE WATKINS EVANS

whom have been connected with the coal industry of Wales since its beginning. His education was obtained in the Washington State College, where he graduated from the mining school with a B. S. degree in the class of 1903.

His experience in the mines dates back to a period previous to his university work, and covers more than 12 years of service in various positions. He also spent five years in Geological Survey work, and for three years was geologist in charge of coal surveys for the Washington Geological Survey.

Following his work for the State of Washington, Mr. Evans did consulting mining work for the U. S. Navy, making a report on the "Alaska Coal Situation." Finishing his work in Alaska, he spent some time as examining engineer for Canadian capitalists, and at the present time is serving as consulting mining engineer, coal di-

vision, of the Northern Pacific R.R. He is also consulting mining geologist of the Carbon Hill Coal Co. and mining engineer of the Hyde Coal Co.

Mr. Evans has done a considerable amount of technical and engineering writing. One of his most important works is "The Coal Fields of King County." His report on the Ground Hog anthracite coal field of British Columbia, and his Report to the U. S. Navy on the Matanuska coal field, are authoritative documents and have been read with interest by all coal men interested in the fields covered.

Mr. Evans is an active member of the American Institute of Mining Engineers and was recently appointed by the Institute to serve on the newly created "Coal and Coke Committee." Few men are better acquainted with conditions in the Western coal fields of this country and Canada than Mr. Evans, and there is no doubt but that the character of his work entitles him to rank as one of the principal coal authorities of the Pacific Coast.

X

### The Contraband Question on the Great Lakes

On the matter of coal shipping on the Great Lakes, the United States government has issued the following instructions to collectors of customs:

1. You will permit foreign-bound vessels in your district to clear only after they have filed with you their full and final manifests.

2. You will notify all merchant vessels in your district that they will be subject to inspection and examination of documents, ships, and cargoes by United States authorities before clearance is given, and will be subject to further examinations after clearance, and while such vessel remains within the territorial waters of the United States. Such vessels shall stop and lie to for examination when signaled by a United States vessel.

3. Any foreign-bound vessel whose character as a merchant vessel is established to your satisfaction is entitled to clearance (under the above conditions), no matter what the character of her cargo, or what her destination.

4. You will not refuse clearance to merchant vessels, whether of the United States or other neutral power, or whether of a belligerent power, solely on the grounds that the vessel contains contraband of war.

X

### Coal Mining in South America

None of the South American countries rank as important coal producers. Chile mines about 1,000,000 tons of coal annually for steamship purposes at Lebu and Tolahuano. Peru mines 330,000 tons annually, while Brazil, Argentine, Venezuela and Colombia produce no coal of consequence.

In Peru, the coal industry is controlled by an American (U. S.) concern, the Cerro de Pasco Mining Co. Their fields are at Goyllarisinsga and Quis-Knarcancha.

Colombia has most extensive beds of coal adjacent to the Panama Canal. These fields would seem to have a bright future, and are worthy the attention of American capital. Practically all the lowlands on the entire north coast of Colombia are underlaid with a good grade of fuel.

X

The practical unit of electrical resistance is the international ohm, which is the resistance offered to an unvarying electric current by a column of pure mercury at a temperature of melting ice, 14.4521 grams in weight (0.51 oz.) of a constant cross-sectional area, and 106.3 cm. (41.85 in. in length). To obtain a concrete idea of this unit, it should be remembered that a copper wire, having a diameter of  $\frac{1}{10}$  in. has, at 68 deg. F., a resistance of approximately 1 ohm per 1000 ft.

## Editorials

When the present war commenced, great alarm was felt by American coal operators over the possibility of an exodus of alien miners to Europe to serve in the armies of their native countries. Much of this fear was unfounded as subsequent events have proved. Here and there, we find instances where a dearth of labor has handicapped operations, but generally the expected outflow has not materialized to such an extent that vacancies in the ranks of labor could not be filled. In fact, taking the country as a whole, and considering all its varied industries, careful estimates show that of the 40,000,000 workers in the United States, less than 800,000 have citizenship in the nations at war.

¶

However, where the European war does cause a scarcity of labor in this country through aliens returning to fight, the industry affected will necessarily be obliged to turn more earnestly to the use of machinery, and there could be no more happy solution for the problem. A demand for more mechanical appliances means greater prosperity for our factories and mills that supply such equipment. The history of every recent war shows that inventive genius has supplied the machinery needed to do the work of absent men.

¶

So far as precedent is concerned, there is no basis for the belief that the European war will prostrate business throughout the world for long. During the American civil war, this country entered a period of record production in many of our factories and mills. It is also interesting to note the effect of the Napoleonic wars on the trade of the United States. All Europe was fighting while America was at peace. During the 15 years covered by the European struggle, American foreign trade increased nearly 500 per cent., and the tonnage of American ships even more.

¶

### Mine Fires

During the past year there have been a number of serious fires on the surface and underground at various coal mines. These disasters should teach all coal men the advisability of adopting measures to prevent such accidents. A mine fire always has dire possibilities, because of the great number of men who are likely to be affected.

Practically all mine managers realize the dangers that may result from the use of timber in the construction of headgears at colliery plants. It cannot be long before the laws of all coal-producing states will rule against the use of wood in structures adjacent to mine shafts.

We are also coming to recognize the necessity of having a trained fire brigade of colliery employees at every mine. Such a corps of experienced men could render prompt service in overcoming any fires that might occur. This is an age of specialization and men who are quite familiar with improved methods of rescue work are frequently ignorant concerning the best practice in extinguishing a serious mine fire.

One lesson taught by recent fires is the great importance of being able to reverse the mine ventilation. Not so very long ago a fire occurred in the workings of a European mine. At a critical moment the fan stopped, and it appeared impossible to save the lives of the men underground. Fortunately, the downcast shaft contained a number of steam pipes, and the presence of these caused the air to automatically reverse—the downcast shaft becoming an upcast. Many other instances might be cited where the reversal of ventilating currents saved the lives of men.

If you haven't a trained fire brigade at your colliery, organize one immediately and arrange for a course of instruction for the men which will cover the very latest practice and include all modern ideas with reference to the successful handling of mine fires.

¶

### The Union's Attitude to Safety

The miners' unions are favorable to safety and first-aid. It is true that occasionally the miners, as at the Delaware, Lackawanna & Western R.R. Coal Department mines, object to the patrolmen but much of that feeling is due not so much to a lack of interest in safety as to an objection to the personnel of the patrol corps or because of a dislike of close supervision. The persons selected for the inspectional patrol are middle-aged and active men of training who are suited for advancement in official capacities and the older miners irk at the authority given them by the company.

Most of our managers would not like to have men at their elbow always nagging them about safety. A little irritation should not be unexpected, at least until the men get accustomed to the unwonted interference. The operator, if we rightly recall, has been known at times to find that important functionary, the state mine inspector, an annoyance and as to some operators' opinions of certain clauses of the mine law, the less said the better.

Indeed, perhaps the operator is sometimes right and the law wrong and even at the face, the miner of many summers may be sometimes correct in his judgment and middle-aged patrolmen wrong. Still laws are good and so are mine inspectors and we believe patrolmen will also serve a good end. Meanwhile let us keep our perfect balance, for the man behind the desk and the man at the face on the whole are at one in wanting to see a safe mine, and perhaps if there is any difference between them, the latter is the man most interested for if the roof falls it is his head or his back which is broken.

We know the old rhyme about "all the bigger fleas have little fleas to bite 'em and little fleas have littler fleas and so *ad infinitum*." The miner must not think he alone is hectored. When the operator is told that he must put in a larger fan, he is as much heckled as the man who is sent out to get his auger made to gage and some operators act in the same petulant manner as the men they employ and say they will shut down rather than comply.

So the operator must "sit tight" on this subject. The probabilities are that he has in his mine, a lot of sympathizers with his safety notions. It is interesting to note that at Charleroi, Penn., when subdistrict No. 3 of district No. 5 of the United Mine Workers of America held an annual outing of miners, the main features were first-aid speeches and field practice.

The unions are giving prizes for first aid and several of them have indorsed the movement and a certain enthusiasm is spreading fast; only there is, of course, a natural feeling against it because the operator will persist in publishing that the miner is to blame for most of the accidents. Of course he is. What else could be expected? There are 200 or 300 men in a mine. If the operator is to blame as often as his men, he is taking more than his due share in making the mine unsafe.

Though the miner is frequently to blame he is probably filled with a due sense of responsibility, but he does not like to be always reminded that the operator thought of safety before he did. After all, it is doubtful if the operator has a patent or even a copyright on "Safety first." This only is probably true: That when the idea did light on him, he had the time and the money to make his wish a general practice.

Let us wait and we shall see that the unions and the individual men will do their part. Sometimes we are apt to think that all they care for is to puzzle out expensive legislation for the operator. But there is another kind of activity and who will say they do not exhibit it?

■

### Ventilation Rules

A study of the laws of the various countries regulating mine ventilation is an enlightening occupation. In no country have the authorities covered the subject in a more comprehensive manner than in France. The French laws aim at three things, (a) a supply of air sufficient to insure hygienic conditions, (b) enough air to avoid an excessive rise of temperature, and (c) sufficient ventilation to guarantee the absence of danger arising from foul gases or smoke.

In French mines the speed of the air current in the shafts and entries must not exceed 26 ft. per sec., except in such places as are not ordinarily used for the transport of material or the traveling of persons. The law only requires that each man be supplied with 1.77 cu.ft. of air per sec., and inspectors satisfy themselves as to the mine owners compliance with this latter requirement by measuring the quantity of air at the intake, and then dividing that quantity by the number of men underground. They further endeavor to see that the bulk of the air reaches the faces of the workings.

The French idea of dividing all mines into three classes; namely, distinctly fiery, slightly fiery and non-gaseous, is a good one. The decision as to which class a mine belongs is left to the local inspector in conjunction with the mine owner and a representative of the workmen. This classification of a mine may relate to the workings as a whole or only to an independent section. The classification of mines in respect to coal dust is on lines similar to that on firedamp.

Another interesting rule of the law is that which fixes a maximum temperature in which men may work underground. This prescribed temperature is 95 deg. F. on dry bulb, or 86 deg. F. on wet bulb.

There is much that legislators who busy themselves in writing laws to control operations in American coal mines might learn from a perusal of mining regulations of some of the European countries. What we need in America is not so much quantity in mine laws as quality. It is inadvisable to enact measures that cannot be enforced at all, or to pass laws that greatly burden operators, without resulting in the attainment of any desirable end.

■

### Animal versus Mechanical Haulage in Mines

Several humane societies, especially in Europe, have as their real object the removal of horses, mules and ponies from mines. We are pleased to note, however, that their original views and aims are somewhat modified. Investigation showed that the evils attendant upon the use of animal haulage in coal mines cannot be abolished at one fell stroke.

The investigators had little trouble in proving that mechanical haulage, as a general rule, is cheaper, faster and more sanitary. It was further shown that where conditions such as suitable gradients, continuity of seam and absence of faults are found, it would be possible for mechanical haulage to entirely supersede horses in new mines, and also in the extension of some old mines where there is a source of power available at a convenient point.

On the other hand, it was evident to those conducting the research that at certain old collieries it might be possible to adapt the workings for mechanical haulage, but at a prohibitive cost. It is interesting to note the conclusions arrived at by the National Equine Defense League officials in England, which organization recently collected data covering the subject of animal haulage in coal mines. Following their research this policy was announced:

- (1) To secure by legislation the best possible conditions for the horses and ponies that must be employed in mines.
- (2) To insure that no more horses than are absolutely necessary shall be used in mines at the present and for the future.
- (3) To promote the use of mechanical traction wherever possible.

■

### Prevention of Breakage

In many places, the question of breakage in loading and handling coal is an important problem. A considerable number of mechanical appliances have been installed to meet the needs of each case. No one solution is of greater value than the belt conveyor. At one mine where rapid dispatch and careful handling were essential, the owners supplied themselves with a coal-belt elevator capable of dealing with 700 tons of coal per hour.

This particular conveyor was 207 ft. long and 42 in. wide; it was carried on a fixed steel girder, and delivered the coal by means of a telescopic shoot provided at its outer extremity with a revolving lip. The entire belt was driven by electrical power.

Under certain conditions, there is nothing that equals the belt conveyor as a means of handling large outputs of coal when the product is easily liable to fracture.

## Legal Department

### Power of Legislature to Regulate Coal Mining

BY A. L. H. STREET\*

In sustaining the validity of the law enacted in Ohio, Feb. 5, 1914, which regulates the weighing of coal at mines where miners are paid according to quantities produced, and which empowers the Industrial Commission to fix the standard for compensation in case of dispute between operators and miners, the United States District Court for the Northern District of Ohio said in the recent case of Rail & River Coal Co. vs. Yapple, 214 Federal Reporter 273:

"Without determining the soundness of the argument that the act, indirectly at least, establishes a minimum wage, in that it insures the miner full pay for all coal mined in accordance with the prescribed regulation, it may not be said that, in supplying an incentive for more effectually securing the removal of fine coal and coal dust to the surface, and thereby minimizing or dissipating the danger arising from their continued presence in the mines, the act does not provide for the health, safety and general welfare of employees. Furthermore, section 36 was designed to limit, by appropriate legislation, the freedom of contract as regards the methods of mining, weighing and measuring coal. We are not prepared to hold that the Legislature, acting within the scope of that section, may not say that the business of mining coal is so far affected with a public interest as to justify appropriate regulation of the manner of paying employees when they are to be paid according to the quantity produced, and when such regulatory statute will operate to allay discord and strife and conserve the coal supply. The Ohio act does not restrict the right of contracting for the labor of miners by the day, week, month, or year, or in any other manner (except as to quantity) that the operator may deem proper. If the miner or loader by the terms of his employment is to be paid by the ton or weight, the right of contract is then curtailed to the extent that he shall be paid according to the total weight of the coal contained in the mine car, such contents to include, however, no greater percentage of slate, sulphur, rock, dirt, or other impurities than is unavoidable, as determined by the Industrial Commission. If the employee should send to the surface an excess of such impurities, or any of them, the operator is not required to accept the car or pay for its contents as delivered, but is at liberty to agree with him as to the deductions to be made on account of impurities. If no agreement is made, the offending employee may be prosecuted for his violation of the Commission's order as for a misdemeanor. If he be unable or unwilling to pay the fine imposed, he may be imprisoned in the county jail until his fine and costs are paid, or secured to be paid, or he is otherwise legally discharged, provided he be given credit upon his fine and costs at the rate of 60c. per day for each day's imprison-

ment. He is thus subjected to penalties which are neither obscure nor uncertain. The act does not require the operator to mingle the contents of such a car with the other coal produced, or prevent his removing, by screening or otherwise, the excess of any impurities. It must be presumed that the Industrial Commission will perform its official duty and fix a standard which will exclude all slate, sulphur, rock, dirt, or other impurities, except such as is unavoidable. The operator, if given the unrestricted right of contract, could do no more. If dissatisfied with the Commission's order, which by statute is made *prima facie* reasonable and lawful, he may petition for and obtain a hearing before the Commission as to those features, and may thereafter have a speedy review of its action by the Supreme Court of the state. \* \* \* The law permits the employer and employee to stipulate as between themselves what percentage of coal commonly known as nut, pea, dust and slack shall be allowed in the output of the employer's mine. It is only in case of their disagreement that the Commission may designate such percentage, and its orders in that behalf must possess the same characteristics as those above mentioned, and are likewise subject to rehearing and review."

### Recent Legal Decisions

**When Contract to Sell Coal Property Will Not Be Enforced**—Suit cannot be maintained to compel performance of a contract to sell coal underlying land, when it appears that the purchaser took the contract for speculative purposes and was unable to perform his part of the agreement until he found a purchaser, and where he delayed four years in demanding a deed. (West Virginia Supreme Court of Appeals, Wilkinson vs. Poling, 82 Southeastern Reporter, 47.)

**Oklahoma Gross Revenue Tax**—In a decision recently handed down by the Oklahoma Supreme Court, in the case of McAlester-Edwards Coal Co. vs. Trapp, 141 Pacific Reporter, 794, the validity of the following tax law of that state is sustained: "Every person, firm, association or corporation engaged in the mining or production, within this state, of coal . . . shall within 30 days after the expiration of each quarter annual period expiring respectively on the first day of July, October, January and April of each year, file with the state auditor a statement under oath, on forms prescribed by him, showing the location of each mine . . . operated by such person, firm, association or corporation during the last preceding quarter annual period, the kind of mineral . . . the gross amount thereof produced; the actual cash value thereof, and such other information pertaining thereto as the state auditor may require, and shall, at the same time, pay to the state treasurer a gross revenue tax, which shall be in addition to the taxes levied and collected upon an ad valorem basis upon such mining . . . property and the appurtenances thereunto belonging, equal to 2 per centum of the gross receipts from the total production of coal therefrom." Plaintiff mining company is operating under leases from the Federal Government made for the benefit of the Choctaw and Chickasaw tribes of Indians, and unsuccessfully sought to have the law declared invalid as to it on the following grounds: That it does not specify the purpose for which the tax was levied. That it violates the federal constitution in that the United States Government has sole control over the land where the coal is mined, and has granted the company the right to mine such coal, and that the law constitutes an attempt to tax its rights under its leases.

\*Attorney-at-law, St. Paul, Minn.

## Sociological Department

### The Lehigh & Wilkes-Barre Co.'s Meet

First-aid teams from the four districts of the Lehigh & Wilkes-Barre Co. competed at Sans Souci Park, near Wilkes-Barre, on Monday, Aug. 31, that being the company's fifth annual field day.

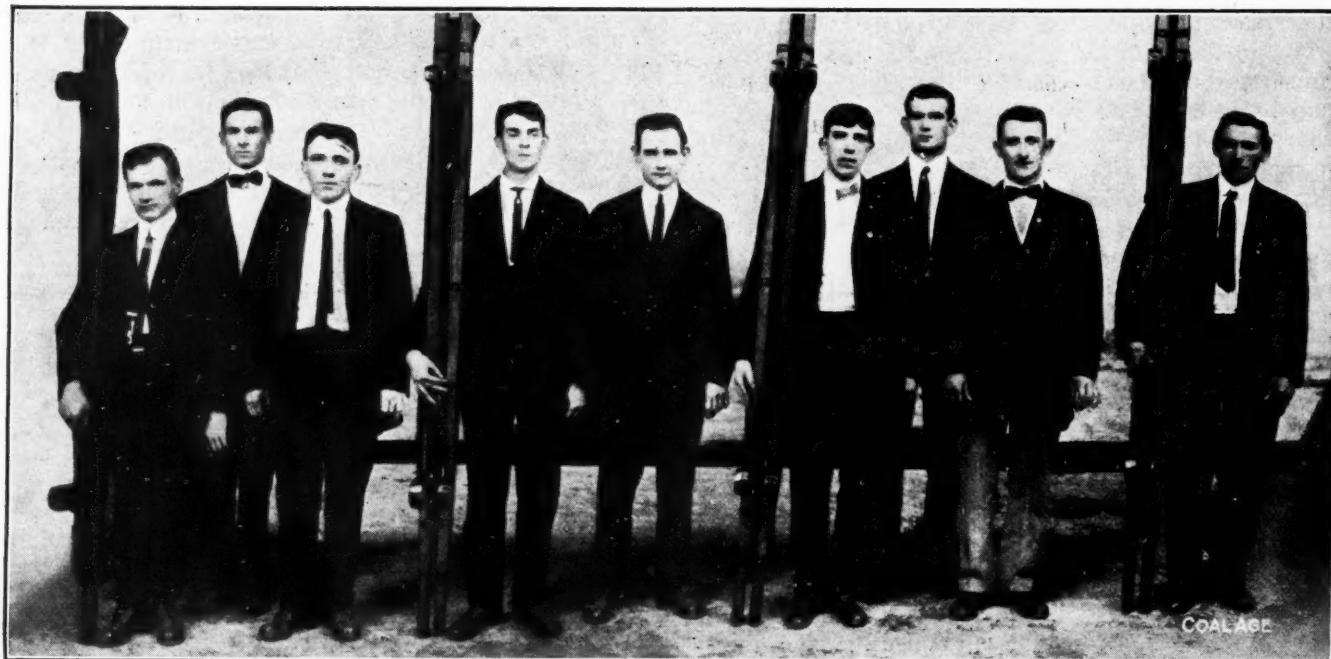
A general holiday was declared for all men engaged in first-aid work, and about 800 men and boys were gathered on the field when the opening event started. Each year there has been increasing interest in these contests, but this year's competition eclipsed that of former years, and while the rivalry was along spirited lines, a friendliness was manifested among all competing teams which indicated that the men in general are striving for proficiency and that they put service to fellowman above all else.

The teams in each of the four districts competed with each other in four different events. The boys, moreover, had an

The judges made the following rating on this event:  
 Hollenback colliery—Outside corps, 95½; Inside corps, 93½; South Wilkes-Barre colliery—Outside corps, 93½; No. 3 shaft corps, 93; No. 5 shaft corps, 91½; Stanton colliery—Outside corps, 98; Inside corps, 89; No. 4 slope corps, 94; No. 4 shaft corps, 93; The Stanton Outside corps was declared the winner of this event.

**Event No. 2**—The second event was for all teams, inside and outside, of the Plymouth district, and the problem given was as follows: "Treat a simple fracture of middle of right leg, simple fractures of both forearms and a cut over right temple. Treat for shock. The dressing for the leg should be short splints extending from middle of thigh to 1 in. or more below the foot using triangular bandages; dress cut, using compress and Gibson roller; dress forearms, using anterior and posterior splints and roller bandages."

The judges awarded the following points: Lance colliery—Outside corps, 94½; Inside corps, 98; Nottingham colliery—Outside corps, 93½; Inside corps, 90½; No. 16 Inside corps,



THE LEHIGH & WILKES-BARRE CO.'S LITTER SQUAD

event of their own. Then the winning teams of each district contested for supremacy with each other. The Parrish inside team carried off the chief prize, each member of the team receiving a bronze medal. In the preliminary event this team made the splendid average of 99, and the work in the final event was so well done that the judges awarded them a rating of 98. The boys' event was won by the team from the Wanamie colliery, with a rating of 96. This team carried off that event last year.

Dr. G. W. Geist, of Wilkes-Barre, was in charge of the program. He is at the head of the company's first-aid work. Edward Griffith, secretary to President Charles Huber, of the L. & W. company, rendered efficient service in working out the details. The judges were Dr. D. H. Lake, in charge of the first-aid work of the D. L. & W. R.R. Coal Department, and Dr. J. H. Hughes, of Nanticoke, Penn. After the events were over the remainder of the day was spent socially.

**Event No. 1**—This event was for all first-aid teams of the outside and inside corps of the Wilkes-Barre district. The problem given was as follows: "Treat a simple fracture of middle right thigh, a burn of left hand, wrist and forearm and an injury to right eye. Treat for shock, dress fracture with long and short splints and triangulants; dress for burn. Use gauze, cotton or waxed paper and circular roller; dress the eye. Use compress and 2-in. roller."

9½; Buttonwood colliery—Outside corps, 98; Inside corps, 88; Parrish colliery—Outside corps, 87½; Inside corps, 99; the Parrish Inside corps was declared winner of this event.

**Event No. 3**—All outside and inside corps of the Ashley district competed in the third event. The problem follows: "Treat a compound fracture, 2 in. below middle of left thigh. Much hemorrhage of bright-red blood supervenes; victim has a punctured wound of the chest between third and fourth ribs on the right side, and a laceration of the left temple. Treat for shock; dress for fracture with long external and short internal splints and triangular bandages, using tourniquet to stop bleeding. Dress wound with compress and 2-in. circular roller bandages from chest to waist with suspender over the right shoulder; dress for cut with a cravat bandage with middle of bandage and knot over wound and the turn on opposite side."

Points scored by the various teams in this event follow: Sugar Notch colliery—Outside corps, 85; Inside corps, 95; Wanamie colliery—Outside corps, 96½; No. 2 slope corps, 89½; No. 3 slope corps, 93; Maxwell colliery—Outside corps, 92; Baltimore shaft corps, 94; Red Ash shaft corps, 94.

**Event No. 4**—This event was for all outside and inside corps of the Honey Brook Division and the problem was as follows: "Treat a simple fracture, 1 in. above the middle of left thigh; fracture of jaw bone and lacerations of middle



SCRANTON OUTSIDE CORPS  
Winners of Event No. 1

AUDENREID OUTSIDE CORPS  
Winners of Event No. 4

WANAMIE OUTSIDE CORPS  
Winners of Event No. 3

finger of right hand and thumb of left hand. Treat for shock, using dress compress over wounds; stiffen fractured thigh with long external and short internal splints and secure with triangulars; dress finger and thumb with Spica bandages and the jaw with a Barton roller. The points allowed by the judges were: Honey Brook colliery—Outside corps, 94½; No. 15 slope corps, 97; No. 20 slope corps, 93; Audenreid colliery—Outside corps, 98; Inside corps, 97.

**Event No. 5**—All breaker-boys corps competed in this event and the contest created much interest, not only for the boys, but for the adults also. The problem in this event follows: "Bandage fingers, hands, wrist, elbow, arm and shoulder with 2-in. rollers, using spiral reverse and spica as best adapted to different portions of limbs; also make a Barton bandage of the head."

Points allowed by the judges follow: Hollenback colliery, 94½; South Wilkes-Barre colliery, 92½; Stanton colliery, 93; Sugar Notch colliery, 95; Lance colliery, 93; Nottingham colliery, 93½; Wanamie colliery, 96; Maxwell colliery, 88.

**Event No. 6**—The Litter Squad of the Lehigh & Wilkes-Barre Co. gave an exhibition drill as the seventh event. For

15 minutes the members of the team held the strict attention of the crowd as it executed various moves and showed its thorough training in litter work.

**Event No. 7**—This was the big event of the day. The winning teams in the first four events were competitors in the final. The problem was as follows: "Bandage foot, ankle, leg, knee, thigh and hip with 2½-in. rollers, using spiral reverse and spica as best adapted to different positions of the limb; and also make a Gibson bandage of the head."

Points were scored as follows: Stanton colliery—Outside corps, 93; Wanamie colliery—Outside corps, 93; Parrish colliery—Inside corps, 98; Audenreid colliery—Outside corps, 94.

When the last event was over the 800 employees and friends of the Lehigh & Wilkes-Barre Coal Co. went to the upper pavilion of the park and a dinner was served. An orchestra and a glee club from Plymouth rendered several selections. Many of the favorite songs of the day were sung by the guests and Attorney A. H. McClintock, of Wilkes-Barre, was introduced as the speaker of the day. He had just returned from Europe, having had much difficulty in leaving the Continent. He was arrested as a German spy, and many of the stirring events that had taken place on the Continent were fresh in his mind.

Attorney McClintock then presented pennants to the captains of the Stanton Outside, the Parrish Inside, the Wanamie Outside, and the Audenreid Outside teams as a sign of leadership in the events in which they had competed. Then the members of the Parrish Inside team were presented with bronze medals. The captain of the Wanamie Boys' team also received a pennant.



### Mining Education in Anthracite Region

The fourth annual report of the Nanticoke district Mining Institute shows a membership of 821 as against 679 last season. There were six meetings of the Nanticoke mining classes with an average attendance of 432. Last season this average was 199. The enrollment of the classes increased from 657 to 841. At the state examinations for mine foreman's and assistant mine foreman's certificate 6 members passed the examinations for the former and 24 passed those for the latter.

The fourth annual report for the Shamokin-Mt. Carmel District Institute shows a membership of 788 as against 571 last season. There were seven meetings of the mining classes with an average attendance of 313. Last season this average was 127. The enrollment of the classes increased from 763 to 1016. At the state examinations for mine foreman's and assistant mine foreman's certificates 2 members secured the former and 32 secured the latter.



BOYS' CORPS AT WANAMIE COLLIERY  
Winners of the Boys' Event

The first annual report of the new Williams Valley District Institute shows a membership of 332 and ten meetings with an average attendance of 244. The fourth annual report of the Lehigh Valley Coal Co.'s mine schools at Centralia and Lost Creek shows that the enrollment increased from 51 to 65. Two students secured mine foreman's certificates and 9 obtained certificates as assistant mine foremen during the present year.

The Lehigh Valley Coal Co.'s mine schools are not under public-school board control, yet they are open to all, and 13 of the students this year were not in the employ of that company. In addition the company maintains at Drifton an apprentice school where attendance is compulsory, but the students are paid at their regular rate for the time engaged. This school has completed its sixth successful year.

The Philadelphia & Reading Coal & Iron Co. also privately maintains schools for its miners at Mahanoy City, Shenandoah, Minersville and Pottsville, and many of the students from these passed the state examinations for the coveted mine foreman's and assistant mine foreman's certificates. The state reimburses two-thirds of the annual expenses of those schools under public-school control.

### Garden Awards in Colorado

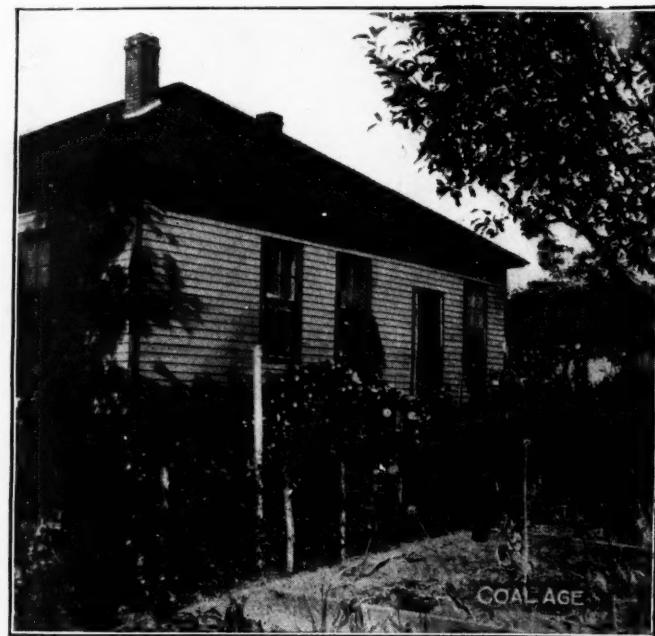
BY FRED W. WHITESIDE\*

The second annual contest for the Victor-American Fuel Co.'s lawn and garden prizes was held early in this month. Three prizes of \$25, \$15 and \$10, respectively, are offered annually in each town where a contest is held.

The only conditions imposed are that there be three or more contestants, and that those competing for the awards be *bona fide* residents of the town in which the Victor-American Fuel Co.'s mine is located.

The superintendent, doctor and mine clerk are excluded from receiving awards in the contest; although the judges are pleased to give anyone of them honorable mention, should he deserve it. A noticeable improvement was observed this year over that of last, when the first contest was held, many more participating, and of those who entered in 1913, a marked advance was attained in nearly all cases.

\*Chief engineer, Victor-American Fuel Co., 307 Ernest & Cranmer Bldg., Denver, Colo.



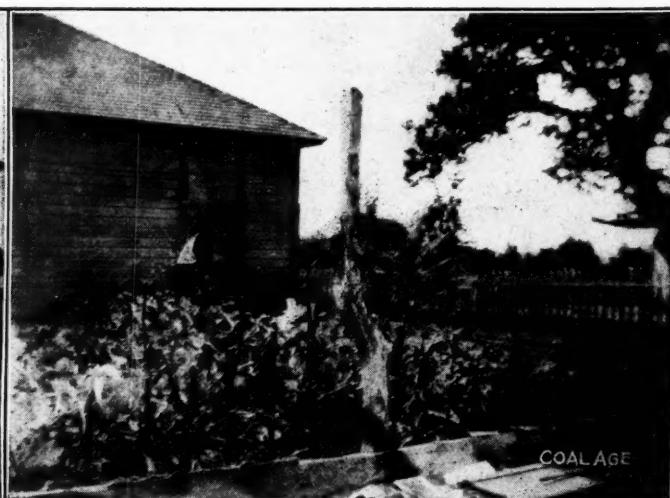
FIRST PRIZE WINNER AT CHANDLER, COLO.  
(Gus Hutter)

In order to make the contest general, no distinction was made between lawns, flower or vegetable gardens. If the plot contained but cabbages, turnips and onions, it received the same consideration and rank as a lawn or garden of flowers, provided it showed the effects of culture, design, neatness and care. And, while this may appear to some a very general classification, it must be borne in mind that the fundamental idea of the founder of the movement is to encourage the people in an effort to develop neat, healthful and sanitary surroundings, to abolish the ash heap, the rubbish pile and the tin can. If a miner is of practical mind and sees greater value in cabbages than grasses or flowers, he has the privilege of planting cabbages and of being qualified to enter the contest. His standing, when the judges make their awards, will be equal to that of the man who cultivates a lawn or plants flowers.

Of the miners who competed, the following received prizes:



SECOND AND THIRD PRIZE WINNERS AT RAVENSWOOD, COLO.  
Robert Nelson (Second Prize)



Joseph Watson, Sr. (Third Prize)

**Chandler**

First prize, \$25, Gus Hutter, House No. 47.  
 Second prize, \$15, Jos. Cherry, House No. 39.  
 Third prize, \$10, W. H. Mulnix, House No. 8.  
 Edward McMullen, judge.

**Delagua**

First prize, \$25, Mrs. Jas. G. Young, House No. 458.  
 Second prize, \$15, Nick Martella, House No. 471.  
 Third prize, \$10, John Ban, House No. 460.  
 E. C. Stream and W. Givens, judges.

**Hastings**

First prize, \$25, Mrs. R. Roberts, House No. 6.  
 Second prize, \$15, W. H. Cunningham, House No. 96.  
 Third prize, \$10, W. H. Rinker, House No. 111.  
 E. C. Stream, judge.

**Ravenwood**

First prize, \$25, Wm. S. Smith, House No. 56.  
 Second prize, \$15, Robert Nelson, House No. 52.  
 Third prize, \$10, Jos. Watson, House No. 62.  
 Prof. I. E. Stuttsman, judge.

ner. At the last moment Dr. J. A. Holmes, chief of the United States Bureau of Mines, sent word from New Mexico, that owing to ill health he was unable to be present and address the meeting.

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**The Ellsworth Liquor Problem**

Much interest was evidenced in the courts of Washington County, on Aug. 15, when the grand jury presented to the court a petition, asking for permission to investigate in detail the charges that the Ellsworth Collieries Co. and prominent men were fostering violations of the liquor laws at Ellsworth and Cokeburg, leading coal towns in the bituminous region.

The court refused to do as petitioned, on the ground that the petition was irregular, and that if such viola-



PRIZE WINNERS AT THE SECOND ANNUAL CONTEST AT DELAGUA, COLO.

Mrs. James G. Young (First Prize)

John Ban (Third Prize)

On the remaining properties of the company, on account of the scarcity of water and other local conditions, no contests were held.

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**The Union First-Aid Meet at Charleroi**

The fourth annual outing of the miners of subdistrict No. 3 of district No. 5, United Mine Workers of America, was held at Eldora Park, Charleroi, Penn., on the afternoon of Aug. 22 and the miners participated in some first-aid contests.

In the open and closed events the Toms Run Mine team of the Pittsburgh Coal Co. won first place with a percentage of 98 in the open, and 99 in the closed event. The winning teams received silver loving cups to hold till the honor is wrested from them. It will take three victories to entitle a team to permanent possession.

In the open event seven teams were entered. The contest was close and the Toms Run team, with Michael Quinn as captain, only beat the Cokeburg team of the Ellsworth Collieries Co. by a fraction of a point. The team from Cokeburg, under the captaincy of Albert Roth, made a mark of 97  $\frac{1}{16}$  per cent.

The Toms Run team was not so narrowly victorious, however, in the closed event. The Ellsworth team took second honors in this contest under the captaincy of Fred Gulick. It earned a percentage of 96.

Cups and individual gold and silver medals were presented by President Van Bittner of District No. 5. Prof. E. E. Bach of Ellsworth was marshal of the contests, and the judges were Dr. G. H. Hays, Dr. R. V. Stewart, Dr. H. F. Bailey, all of Monongahela, and Dr. J. V. Wilson, of West Elizabeth. The recorder was W. L. Manice, of Pittsburgh.

About 5000 miners and their friends were present to witness the events of the day. The chief speakers at the meet were James W. Paul of the United States Bureau of Mines, Philip Murray of Monongahela and President Van Bitt-

tions existed those aware of them should lay their complaint before the duly appointed officers. The court also declined to grant the petition that the grand jury investigate the possible violations of the law by the coal company.

In the petition regarding the coal town, it was alleged that the Ellsworth Collieries Co., backed by the Lackawanna Steel Co., the Bentleyville Brewing Co. and the Charleroi Brewing Co., and E. E. Bach, sociological superintendent of the Ellsworth Collieries Co., who is recognized as an expert in this work, had conspired to violate the law. It was pointed out that the towns of Ellsworth and Cokeburg were denied liquor licenses at the last term of license court. At that time, when evidence was being heard in favor of license applicants for the two towns, E. E. Bach, the sociological expert, made an extended statement to the court and attorneys, in which he dwelt upon the difficulty of regulating the liquor business in a mining town, and emphasized the necessity for a well ordered and carefully regulated tap house or similar institution.

He gave some details about the liquor-order business, regarding which the grand jury is now making complaint. The jury classes beer agents as "devices to evade the law." The court, however, stated it had not the power to grant such a license as that desired, and since that time it is understood Ellsworth and Cokeburg miners have been getting their beer through an agency which the grand jury states is under the supervision of Mr. Bach.

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He who has lost his reputation, is a dead man among the living.

### Mine Houses

If the mine owner knew what the public thinks of the average mine house, he would refuse to let his mining engineer or his building contractor do any more designing. And this applies not only to the small companies, but to the large. The buildings are all of the same type of unattractiveness, and money is rarely saved in a degree commensurate with the monotony which has to be endured. And when an attempt is made to plan houses of different design, there are only a few, at most three designs, and the effect is still dissatisfying.

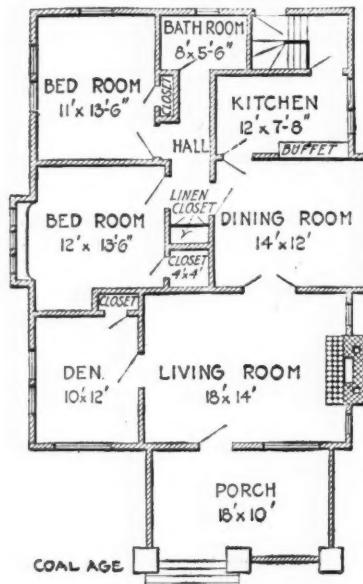
The same is as true of material as of appearance. The mining engineer is not an architect. He has some knowl-

make this prohibitive, but to save this the North American Construction Co. ships every piece cut, so there is no waste. The saving in lumber from this method is also an item, and the cost of carpentry is reduced, for all the sawing is by machinery. The waste of lumber in an ordinary building is claimed to be 18 per cent. of the whole lumber bill. Everything is planned in these houses so that waste will be avoided, and as all parts are purchased or manufactured in large quantities, the manufacturer of the houses should be able to supply them at reasonable cost ready for erection.

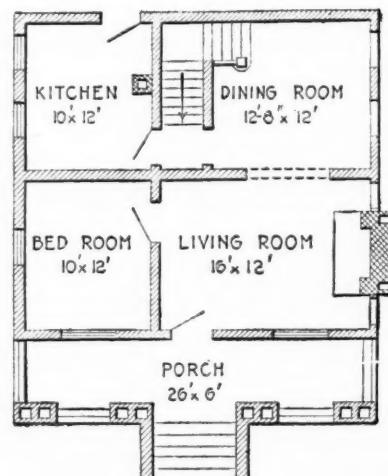
We would advise the coal operator to send to the North American Construction Co., Bay City, Mich., for a copy of "Aladdin Houses." Even if he decides against a



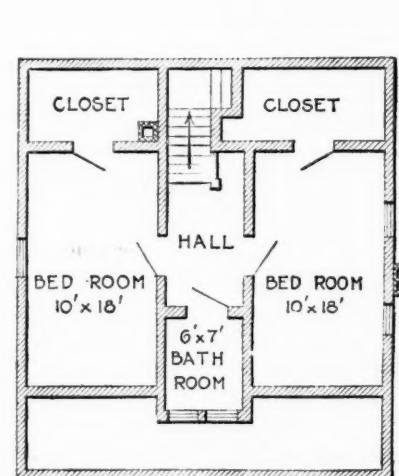
A COMFORTABLE BUNGALOW WITH MODERN CONVENiences



PLAN OF BUNGALOW



GROUND AND SECOND-FLOOR PLANS OF COTTAGE



edge of siding, flooring, lathing, plaster and shingles, and he usually satisfies himself with this. But new material and new methods are on the market. What are good and what are bad, he has no chance of knowing, and what is more, he is afraid to take the risk of recommending them to the operator in case of failure. He consequently plays safe and builds on old lines, thus avoiding responsibility.

#### BUYING HOUSES "KNOCKED DOWN"

For this reason, it might be well to select the houses for a town from a catalog and have the materials shipped. There are places, of course, where the freight rates would

purchase, the book in itself is full of interesting suggestions.

Long spans in high tension current transmission lines cannot always be made with copper cables, since hard-drawn copper has a strength of only about 50,000 lb. per sq.in. When it is necessary to cross over rivers, lakes or bays with power transmission lines, the current may be conducted through an extra galvanized strand of special steel wire of such size and strength as to possess a factor of safety of at least five. In fact, an entire power transmission line of extreme high potential could be economically constructed with extra galvanized Siemens-Martin strand, the adoption of which in place of copper cables would reduce the number of supporting towers, which are frequently the cause of energy loss and trouble.

# The Labor Situation

**SYNOPSIS**—Much pressure is being exerted by the merchants of eastern Ohio to bring about a labor settlement, and as a result a conference has again been called, though with little hope of a result. The Paint Creek Collieries Co. has a strike involving all its men.

■

In eastern Ohio, the merchants have been urging a further conference of operators and miners, alleging in the letters to the latter that by reason of the credits extended, the merchants have borne the brunt of the battle.

So conferences have been resumed at Wheeling, W. Va. The Pittsburgh scale is suggested as a compromise basis for settlement. It is said that both parties are willing to accept an exactly equivalent scale, but, as we said last week, there is little evidence of this willingness on either side. The operators desire as liberal terms as the Hocking Valley miners have granted, while the men desire a virtual increase over last year's scale. But both sides proclaim their adherence to the principle that there is no increase or decrease of wage demanded, and try in that manner to obtain public confidence.

#### Father McEachen's Appeal

The extent to which the public is being brought into the controversy may be judged by the fact that Father Roderick McEachen's lucid statement of the miners' case has been circulated in galley form to the press. The appeal is largely for larger wages in general for miners and for the run-of-mine law; the justice or injustice of the equivalent as offered by the operators is not considered. In fact, we believe we represent the views of the writer in saying that if he had his way, the price would be doubled.

One of his interesting arguments, however, for the equivalent as the miners would have it, is as follows: "For the past 20 years, the screenings have been rated in all the agreements between miner and operator as two-sevenths of the total coal mined. The companies sometimes took a certain amount of coal for their own use. This was not screened. For this they always paid five-sevenths of the screened-coal price. Hence the miner has always worked upon the theoretic basis that five-sevenths of his coal was lump and two-sevenths screenings. Upon this basis, the present rate of mining should be 71c. per unscreened pick-mined ton and 49.64c. per unscreened machine-mined ton. Since, however, the actual amount of screening was greater than 28 per cent. in some districts, the miners made a compromise. They averaged the amount of screenings at 32 per cent. Upon this they base their price of 47c. per unscreened ton of machine-mined coal."

#### The Other Side

We would point out to the divine, and his statement shows his willingness to admit that the amount of coal, thus paid for at a rate of five-sevenths of the lump coal, comprised but a small portion of the whole product. Any injustice to the operator in the rating of this small quantity of coal could be borne, as it was not likely to cause bankruptcy or any marked exclusion from markets. Moreover, much of the coal mentioned was probably sold to local wagon trade and was marketed at a really fair profit. It is a different proposition to apply this to the whole product, especially to that part where competition is more fierce.

Moreover, we wish to point out that his reference to the price at the market is not a matter at point, unless freight rates and profits to retailers are considered. If the coal trade is groaning under excessive freights and high charges for retailing, the mine operators are only chargeable with their own shortcomings, not with those of railroad men and dealers whose iniquities, if iniquities they are, they are powerless to control.

The operators, in a published statement, invite an inspection of their payrolls that the public may know that the miners are not underpaid. They make the statement that in the first half of July, 1913, the average wages of the loaders of the Roby Coal Co. for each day worked were \$3.75 per day. In the second half of that month they were \$4.65 per day. The earnings in the first half were reduced by the reduction in tonnage due to a national holiday. Naturally, the operators strenuously object to rumors that miners in eastern Ohio make only a dollar a day.

#### Conditions in Eastern Ohio

The fans and pumps were restarted at the Fort Pitt mine on Aug. 26. While the engineer at the mine on the 26th was investigating, gas in the engine room exploded, but no harm was done. The mine is full of water, and it will be about six weeks before the workings will be in running order. The pumps have been idle for an equal length of time.

The Coalburgh Coal Mining Co., on Aug. 20, and on Aug. 21, the Bixler & Ohio Coal Co., both of Baileys Mills, near Barnesville, signed the scale agreeing to pay 47c. for machine-mined run-of-mine coal. It is hardly a sufficient defection from the operators' ranks to show even a tendency. The shutting down of the Blockhouse mine, as announced last week, is as reliable an indication in the other direction.

It is understood that Charles I. Albasin, the subdistrict president in eastern Ohio, has secured a large loan from the Illinois operators, by means of which the miners in his subdistrict can continue the resistance to the demands of the operators.

That part of the Pomeroy Bend field which failed to arrive at a settlement in the earlier negotiations, as mentioned in our issue of Aug. 22, p. 299, has now signed up, a compromise having been arranged. In the Bergholz district, an understanding has been reached, but notwithstanding that fact, some of the mines are still idle.

#### West Virginia Troubles

The Paint Creek Collieries Co. again has a strike at its mines, involving this time seven collieries, Mucklow, Wacoma, Banner, Tomsburg, Hickory Camp and Briar Creek. The mines employ from 1000 to 1200 men. The cause of the suspension—for the miners do not call it a strike—is the failure of the company to make its semimonthly pay at the appointed time.

The miners of the Four States Coal Co. mine at Dorothy, W. Va., in the Coal River field, have withdrawn their demand for an increase in wages, according to Thomas Cairnes, the president of the district (No. 17). The men are still demanding a modification of certain working rules, the check-off and some other concessions. The miners are hopeful that the management will grant their demands.

Governor H. D. Hatfield, acting as an umpire, has decided that the New River and Winding Gulf board of arbitration can hear complaints made by persons who are not themselves aggrieved, but who present the grievances of other parties. It is not necessary for those who are entitled to relief from onerous conditions to bring charges against their employers.

#### Colorado Labor War

In answer to our inquiry, we learn from W. W. Wothuppon, major-general, chief of staff, of the War Department, that the men recently hired who are allowed to work for coal companies in Colorado, must be residents of the state, and further, that the order does not specify that they must be citizens. The statement made editorially that all "recently hired" miners must be citizens was taken from an apparently verbatim copy of the notice said to be posted by T. Waterman, lieutenant-colonel, 12th cavalry, at mines in the Boulder-Louisville district. A letter appeared in the "Rocky Mountain News" containing this document as part of its contents. Inquiry is being made as to the correctness of the quotation.

Governor Ammons, of Colorado, after 88 days' delay, has made public the findings of the court-martial regarding the militiamen who took part in the action at Ludlow. Twenty-one men were tried and have been completely vindicated.

The United Mine Workers of America are about to ask the civil courts to declare the court-martial illegal, and to bring the soldiers to trial on charges of murder. Only by changing the venue is there any possibility of the courts finding the soldiers guilty, for the unanimous opinion of the law-abiding public in southern Colorado is that the union has fallen into bad hands and that the militia merits public approval and acclaim.

Twenty prisoners are in jail in Trinidad for offenses alleged to have been committed in the Colorado mine war. William Diamond, a national organizer of the United Mine Workers; James Davis, marshal at Aguilar; Frank Miner, president of the Trinidad Trades Council, and Robert Uhlic, former president of the Trinidad Miners' Union, are among the prisoners.

The federal troops have arrested Helen Schloss, of Denver, for picketing. She was in charge of the miners' hospital at Ludlow.

## Discussion By Readers

### Gasoline Mine Locomotives

In the answer to the question, "Is there any danger in the installation and use of a gasoline motor in a mine," COAL AGE, Aug. 29, p. 358, it is stated among other details that "A gasoline motor is not an ideal motor for use in a coal mine." The answer goes on to state that "the discharge from such a motor rapidly vitiates the mine air; . . . the handling of a highly explosive oil, as gasoline, is always a dangerous factor in a mine, owing to the liability to fire or explosion; . . . the danger of their use is greatly increased by the possibility of a mine wreck when the gasoline tank might be injured and its contents take fire."

I want to say that experience in the development and construction of this class of motor has made it an ideal machine for use in a coal mine. As is true for every other type of haulage locomotive designed for mine use, the success of the gasoline motor depends much on the conditions of service. The gasoline motor has a great many advantages that recommend it for mining use, chief among which are its ability to operate in deep-vein coal mines; in mines with low roofs; under bad roof; in wet mines; on heavy grades; and, last, but not least, in mines which are so gaseous that an electric locomotive could not be installed with safety. This type of locomotive possesses, also, the additional advantage of being able to go anywhere on the main roads and extensions, without incurring the additional expense for wiring or piping, which is necessary in the use of either electric or compressed-air motors.

The further statement that the exhaust from a gas-driven engine vitiates the mine air is not true when this type of locomotive is used for haulage on main or cross-entries, because the exhaust has now been deodorized so that it is not perceptible in a mine where these locomotives are installed. The odor of the gasoline cannot be detected even in the main-return entries of such mines. The only reason that the motors cannot be used for gathering work in rooms or chambers is that the carbon monoxide given off in the exhaust requires to be diluted by an air current in order to render it harmless.

Again, referring to the statement in reference to the danger from fire in case of a mine wreck, permit me to say that, in the improved type of gasoline locomotive, the gasoline is carried in steel, indestructible tanks. The tank is filled and sealed on the surface, and is then taken into the mine and placed on the locomotive when the mine is idle, the other tank being at once removed and taken to the surface to be filled. There is practically no danger of this tank being damaged in a mine wreck, owing to its being located on the locomotive, in such a position as to withstand any kind of a blow.

In closing, permit me to briefly summarize the important advantages of this type of locomotive as follows:

1. Because the gasoline locomotive is a self-contained unit, it does not require for its operation a power house

and coal pile; extra boilers; a compressor or generator; a high-pressure pipe line and charging stations; feeder and trolley wires, rail bonds and other electrical connections and equipment, including a specially well laid track, to preserve the bond connections intact; or any separate traveling ways for men and mules, to avoid contact with live wires.

2. Because the gasoline locomotive is a self-contained unit, the following results are obtained in its use: When the locomotive throttle is closed, all expense of operation stops; boilers do not have to be kept under pressure all day to enable the locomotive to handle a few trips at varying intervals; each locomotive generates its own power according to the work it has to perform, which avoids the waste common to other systems, due to generating more power than is actually required; as the length of haul increases, there is no extra expense required for extension of pipe lines or feed and trolley wires.

In my opinion, these advantages are sufficient to recommend the use of gasoline locomotives in coal mines, under such regulations and restrictions as are necessary to eliminate the dangers to which reference has been made.

E. W. HAMILTON, Engineer,  
Milwaukee Locomotive Mfg. Co.

Chicago, Ill.

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### The Foreigner in Mining

*Letter No. 3*—Mr. Bailey's letter, in reference to the need of educating the foreign element, so largely represented in the coal-mining industry, today, COAL AGE, Aug. 22, p. 315, is interesting, pertinent and suggestive, not only to the coal industry but to the American people at large.

It is clear that the unrestricted tide of emigration from Latin-European countries has foisted upon the American national existence an element whose principles of social, political, industrial and religious life are antagonistic to the basic principles upon which American institutions are founded.

The assimilation and amalgamation of this class as an integral part of American social life could, under ordinary circumstances, be effected by the second method suggested by Mr. Bailey, were it not for the fact that, as a class, they possess a dominant characteristic that is the result of centuries of association with a type of civilization that is wholly un-American, and that forms an insuperable barrier to education along the lines suggested. It is unnecessary to be more specific with respect to the nature and origin of this characteristic trait, as the careful student of race peculiarities will readily perceive the nature of the charges made.

Coming from lands of restricted personal liberties, to a country where the highest degree of freedom consistent with the maintenance of order and the preservation of rights, is assured, it is natural to suppose that these privileges would command their respect and veneration. In-

stead, however, these people regard liberty as unrestricted freedom for the indulgence of the animal propensities of primeval man.

The law under which they have been raised is a menace to their own physical and spiritual life, impelling them to the cultivation of cunning, subterfuge and duplicity—qualities that are not merely detrimental to but destructive of the only element in man, the cultivation of which will elevate him to the high plane of life that his creator designed him to occupy.

While it is true that every normal human being is endowed with the faculty of reason, it is equally true that if this faculty be restricted in its operation, the moral nature of man will become useless as a factor in the attainment of civilization, which is the measure of the standard of morality for every individual, nation or race. Though an individual, nation or race may cultivate physical and mental qualities so as to become giants in these respects, they are no farther advanced in civilization than primitive man. If this is not true, why are the so called civilized nations of Europe engaged in the most barbaric struggle of destruction that has ever disgraced the history of mankind?

The instruction of these people and the cultivation of their mental and moral natures is not, in my opinion, the question that confronts us. To do that is, I believe, an impossibility. That which is in a state of adolescence can be educated and trained; but that which is perverted is beyond redemption. If it were possible to completely separate these people from their environment; disabuse their minds of their perverted ideas of justice, morality and law; demolish the superstitions that constitute the barriers to progress, there would be a possibility of inculcating in them the principles of freedom that form the basis of our social institutions. The task is more than herculean; it is impracticable and the time and labor devoted to its accomplishment is energy wasted.

Many foreigners come to our country with no intention of making themselves American citizens, or submitting themselves to American laws; and, although some go through the formality of taking out naturalization papers, many regard it as an intimation that our customs and institutions are superior to their own. Is this not the case? For the most part, they make no effort and express no desire to be educated in our methods of government. They import their customs and, taking advantage of the extreme liberality of our laws, graft them upon American institutions. The governments of which they are representatives, in their efforts to oppose the establishment of representative governments in Europe, have indelibly impressed upon the minds of the people that earthly rulers exercise their authority by divine appointment.

Such a subversion and enslavement of the masses could be accomplished only by the connivance and coöperation of the ruling powers in state and church. The method adopted was to limit or restrict education; to subjugate the mind by encouraging belief in the supernatural; and to impress upon the mass of the people, by spiritual instruction, the idea that they occupy an inferior position in life through divine will.

Such is the education and training of the people we are importing without restriction and injecting into the industrial and social life of this country. Well may we ask, are they a menace to our social, political and industrial welfare? This question needs no better answer than

the incidents quoted by Mr. Bailey in his letter; but if further evidence of the danger is required it may be found in the fact that the sentiment of this class toward our institutions has already been recognized by the introduction of a bill in our national congress, providing for a stringent regulation of immigration along lines in accordance with the facts I have rehearsed. As a rule, our legislators are slow to perceive the existence of a serious or critical situation and when they do recognize such fact the public at large can take it for granted that the conditions actually exist.

Let me say, then, that Mr. Bailey's first suggestion is the only practical solution to the question; namely, "the exclusion of the morally uneducated and mentally undeveloped immigrant." If such a bill could become operative, as a law, there would certainly result a termination of immigration from these countries, since such a qualifying condition would exclude both the governed and the governing classes—the first through being morally perverted, and the second by being moral pervertors.

I. C. PARFITT.

Jerome, Penn.

*Letter No. 4*—I was much pleased, in reading this week's issue of COAL AGE, to note the great interest taken in the foreign-speaking miner. Truly, there is no subject that should interest the mine foremen of this country more than that of the foreign-speaking miner who, it must be acknowledged, is here and here to stay.

So often we hear the remark, "They all want shipping back to the old country." But, anyone making such a remark simply does not know what he is talking about. It must be remembered that, in coal mining, we depend almost wholly on this class of labor; and, take them as a whole, they are good workers. The better they are treated, the better men they become. I know this to be a fact by experience, having dealt with them for a number of years. I have taken these men right into the mine, as they come from the old country fresh from following the plow, and have watched them grow to be good miners and good citizens generally.

I acknowledge that the majority of this foreign element employed in the mines are illiterate and come from the lowest classes in their respective countries where they never had a chance. On coming to this country, their conditions are so much changed that it often proves too much for them. The man who has been brought up from his boyhood, on the farm where he has found it barely possible to make both ends meet, and has rarely had the sight of money, finds himself almost bewildered on coming to this country and receiving his first pay of a few dollars. Could we put ourselves in their place and imagine that we were in a strange country where we could not see a familiar face or understand a word spoken and where the ways and customs were wholly different from those to which we were accustomed, we would have more sympathy for them in their present situation.

It is, of course, often annoying and very trying for a busy foreman to be obliged to explain a simple thing, in a number of different ways, before he can make them understand what he wants to tell them. But, as foreman, it matters not what these men want to say, I always hear them and, though it takes considerable time and trouble, I try to give them an answer and make them understand. I have always noticed that they are quick to appreciate this treatment. Another feature of the foreigner, is that

he is quick to notice any favoritism shown to another. For this reason, I try to treat all alike. I have noticed, also, it is a hard matter to regain their confidence if this is once lost. A foreigner seldom forgets an injury.

The foreword, COAL AGE, Aug. 29, p. 329, contains much truth in regard to the treatment of miners; but I think this refers more to the mine foreman than to the timekeeper. Where a timekeeper is asked one question by these men, the boss is asked 50 or more; and it is even more important for him to give a civil answer in return, than for the timekeeper who is not responsible for their work. What sounds better than to hear a boss, when going into a place, sing out, "Good morning, boys, what is it going like today?" Such a kindly greeting of the boss encourages the men and makes their troubles lighter because of the interest shown in their welfare.

In the daily visits of the boss, to the working places of the men, many matters come up for him to decide; and it is hard for him to know what to say or do, as between the men and his employers. If, however, he is guided by a kind heart. He is sure to come out right in the end. When a man has done something that is wrong, it is generally easy to tell whether he did so, knowingly, or acted in ignorance; but, in either case, no good will come from calling him hard names. Talk to him quietly and show him his mistake and the danger.

In closing, let me say, never be above speaking to your men as you meet them. It pleases them to know that you remember their first name. Because a foreman's wife is with him is no reason why he should not speak thus familiarly to the men he meets. Nothing is more pleasing to them than to be recognized at such times. While giving men all the liberty possible, a foreman should not fail to respect his position, for by that means he will be respected. The American foreign-speaking miner seldom fails to respect his boss when properly treated.

THOS. HOGARTH.

Heilwood, Penn.

■

### Thomas R. Pierce

[Contributors to the Discussion Department will regret to learn of the death, July 9, of Thomas R. Pierce, Scranton, Penn. Mr. Pierce had worked in the mines from a boy. By his devotion to his work, he had contracted disease that, for 19 months previous to his death had kept him out of the mines. His spare hours were spent in reading and writing. His article on The Coal Miner, COAL AGE, Aug. 29, p. 355, published before learning of his death, was one of his best productions, as was also his article on Working Coal under Sandstone Cover, Letter No. 10, COAL AGE, Vol. 4, p. 949.—ED.]

■

## Study Course in Coal Mining

BY J. T. BEARD

### The Coal Age Pocket Book

**Drainage**—Economic mine drainage requires such a disposition of the openings driven in the seam for the extraction of the coal, including all passageways, headings and chambers, that the water coming from the strata will flow by gravity, either to the main sump at the shaft or slope bottom, or to certain gathering centers from which it can be readily siphoned to the main sump or pumped directly to the surface.

In practically level seams or seams having slight inclination, the question of drainage does not materially affect the general mine plan. In this case, good roadside ditches afford the necessary waterways by which the underground water flows to the sumps provided to receive it. Such sumps or catch basins are located at one or more convenient low places or "swamps," in the mine, where it is possible to install a pump of sufficient size to handle the water of that section at all times.

The rooms or chambers, in practically level seams, are turned off both entries of a pair, which greatly reduces the expense of entry driving and necessary maintenance of roadways and air courses.

In inclined seams the direction and amount of pitch are controlling factors in determining the general plan of the mine, in respect to the course of main roads, cross-headings and rooms or chambers. In respect to drainage, it is important to drive all such openings to the rise, in order to avoid the annoyance and expense of providing artificial means of draining the working faces.

**Haulage**—Economic mine haulage requires that the coal, like water must gravitate, as far as practicable, from the coal face where it is mined, to the foot of the shaft or slope opening from whence it is hoisted to the surface.

In level seams, the question of haulage does not affect the plan of mine; but, in seams of more or less inclination, it becomes a matter of first consideration.

In inclined seams, it is always possible to drive the main haulage roads in such a direction that the grade of the road will not only favor the movement of the loaded cars, but will be such that the power required to haul the loaded trip out of the mine will be equal to that necessary for hauling the empty trip back into the mine. This is called the "economical grade." (See Mine Haulage.)

The grade of any road, or the road grade, in an inclined seam, may be calculated when the angle of inclination of the seam and the angle the road makes with the strike of the seam are known, by the following rule:

**Rule**—The tangent of the grade angle is equal to the tangent of the angle of inclination of the seam, multiplied by the sine of the angle the road makes with the strike of the seam.

Or, calling the angle between the road and the strike of the seam, the "road angle," this angle is calculated by the use of the formula

$$\sin \text{road angle} = \frac{\tan \text{grade angle}}{\tan \text{inclination}}$$

### The Coal Age Pocket Book

#### MINE DRAINAGE

The drainage of a mine relates to and includes all methods, means and appliances used to free the mine of the underground water that finds its way naturally into the workings and renders them unfit for work. The expression "unwatering the mine" is frequently used in respect to mine drainage, but applies more properly to the work of removing considerable quantities of water from a mine or section of a mine that is flooded to such an extent as to prevent or seriously impede the operation of the mine.

**Underground Waters**—The rock strata forming the crust of the earth are the natural receptacle of water that, under the action of gravity, percolates downward from the surface. By the laws of nature, there is, besides, a more or less continuous evaporation of water from the earth's surface into the atmosphere, forming mists and clouds that, again, give up their water by condensation causing the rain, snow and hail that fall to the earth.

There is thus naturally formed three distinct zones or divisions of the waters of the earth, which accordingly may be designated as, atmospheric, surface and underground, the last named being of the greatest concern in the prosecution of mining work.

**Water Level**—The term "water level," as applied to mining, is frequently misunderstood and its importance, therefore, not comprehended. The term has no reference or relation to the term "sea level," which is a definite term whose meaning is well understood. On the other hand, "water level" varies widely in different sections of the country, and with the change of seasons, in the same section. It is far from being a constant or definite level.

The water level in any locality is indicated, in a general way, by the average water level in the wells in that section. This level is higher in wet than in dry seasons of the year, and is modified locally by conformations of the strata forming basins and synclines more or less isolated and distinct. The term may, therefore, be defined as the natural drainage level in the rock formations.

**Water-Bearing Strata**—Rocks differ in their nature in respect to their capacity for holding water or permitting water to pass through them. Many of the harder, close-grained rocks of the igneous and metamorphic types, as granite, syenite, trap, and even the sedimentary shales, limestones and clays are wholly impervious to water; while the more porous and coarser-grained sandstones, sandy shales and faulted limerocks afford ample storage for large quantities of water, and permit the ready passage of water through them. These rocks are the so called "water-bearing rocks" of the coal formations.

**Effect on Mining**—The water-bearing strata form the great underground storehouses and waterways or channels by which the water enters the mine. The rocks themselves, particularly the softer calcareous rocks, carbonates and sulphates, are dissolved, disintegrated and worn away by the water, and larger channels and crevices are formed in which the water accumulates under great pressure.

## Inquiries of General Interest

### Problem in Algebra

While thanking you much for the trouble taken in answering my question, COAL AGE, Aug. 29, p. 357, permit me to ask if there is not a misunderstanding somewhere in this problem. I understand that the conditions stated assume that B changes his rate by increasing it  $47\frac{3}{7}$  yd. per min., *after* meeting A. By this understanding of the question, the results given in the answer, p. 357, do not prove out. I should be glad to have a further explanation.

STUDENT.

Lincoln Place, Penn.

The statement of the question is somewhat ambiguous. The solution given on p. 357, assumes that B must increase his rate  $47\frac{3}{7}$  yd. per min. over the entire course, in order to make the race a "dead heat." We agree with correspondent, however, that the probable meaning of the question is, as he states, that B changes his rate *after* meeting A. We give below the solution of the problem on this assumption.

The question reads as follows:

"A," in running a race with "B," to a post and back, met him 10 yd. from the post. To make it a dead heat, B would have to increase his rate  $47\frac{3}{7}$  yd. per min. But, if without changing his pace B had turned back on meeting A, he would have reached the starting point 4 sec. later than A. What is the distance from the starting point to the post?

**Solution**—Let  $x$  = the required distance from the starting point to the post, in yards. Then, in the first stage of the race, A runs  $x + 10$  yd., while B is running  $x - 10$  yd. If, now, without changing his pace, B turns back on meeting A, he reaches the starting point 4 sec. or  $\frac{1}{15}$  min. later than A. The first step in the solution is, therefore, to find the amount A gains on B in the second stage, from knowing the gain (20 yd.) in the first stage.

Since both A and B, in this case, keep the same pace after, as before meeting, and A runs  $x + 10$  yd. before and  $x - 10$  yd. after meeting, the distance ( $d$ ) gained in the second stage is found by the proportion

$$(x + 10) : (x - 10) : : 20 : d$$

$$d = \frac{20(x - 10)}{(x + 10)}$$

If B goes this distance in  $\frac{1}{15}$  min., his rate of running is as follows:

B's first rate,

$$\frac{15 \times 20(x - 10)}{(x + 10)} = \frac{300(x - 10)}{(x + 10)} \text{ yd. per min.}$$

Now, assuming that B increases his rate, at the moment of meeting A,  $47\frac{3}{7}$  yd. and, by this means, the race is a "dead heat"; he must run  $x + 10$  yd. at a pace of,

B's second rate,

$$\frac{300(x - 10)}{(x + 10)} + \frac{332}{7} = \frac{347.43x - 2525.7}{(x + 10)} \text{ yd. per min.}$$

It is necessary, now, to find A's rate, which is unchanged throughout the race. Since, in the first stage,

A runs  $x + 10$  yd. while B goes  $x - 10$  yd., these distances being proportional to their respective rates, A's rate is found thus,

$$(x - 10) : (x + 10) :: \frac{300(x - 10)}{(x + 10)} : A's \text{ rate}$$

$$A's \text{ rate} = \frac{300(x - 10)}{(x + 10)} \times \frac{x + 10}{x - 10} = 300 \text{ yd. per min.}$$

Finally, in the second stage of the race, when B runs  $x + 10$  yd. while A is going  $x - 10$  yd., the distances being proportional to the respective rates,

$$(x + 10) : (x - 10) :: \frac{347.43x - 2525.7}{x + 10} : 300$$

$$(347.43x - 2525.7) \frac{x - 10}{x + 10} = 300(x + 10)$$

$$(347.43x - 2525.7)(x - 10) = 300(x + 10)^2$$

$$47.43x^2 - 12,000x = 4743$$

$$x^2 - \frac{12,000}{47.43}x = 100$$

$$x = 253.4 \text{ yd.}$$

Distance to post,

Other values are as follows:

B's first rate,

$$\frac{300(x - 10)}{x + 10} = \frac{300 \times 243.4}{263.4} = 277.22 \text{ yd. per min.}$$

B's second rate,

$$277.22 + 47.43 = 324.65 \text{ yd. per min.}$$

Time, first stage,

$$(253.4 + 10) \div 300 = 0.8780 \text{ min.}$$

Time, second stage,

$$(253.4 - 10) \div 300 = 0.8113 \text{ min.}$$

Total 1.6893 min.

The proof of this solution is the following:

By A,  $300 \times 1.6893 = 506.8 \text{ yd.}$

By B, one pace,

$$277.22(1.6893 + 0.0667) + 20 = 506.8 \text{ yd.}$$

By B, two paces,

$$277.22 \times 0.878 + 324.65 \times 0.8113 = 506.8 \text{ yd.}$$

### Draining Mine Sump

Referring to the answer given to the examination question, COAL AGE, Aug. 22, p. 318, in regard to the time required to drain a mine sump, which is found to be 5 hr. 5.7 min., I do not understand how 28.274 sq.in. divided by 144, which is the number of square inches in a square foot, can give 19.63 cu.ft. How is it possible for square inches divided by square inches, to give cubic feet?

CONSTANT READER.

Latrobe, Penn.

Correspondent should have given his name when writing, so that this simple oversight on his part could have been answered by mail. He has overlooked the multiplication by 100 ft., which gives cubic feet.

## Examination Questions

### British Columbia Examination, May 20, 1914

#### (Selected Questions)

*Ques.*—Is firedamp compressible? What effect has a decreased pressure of the atmosphere on this gaseous mixture?

*Ans.*—All air and gases are compressible. Any decrease in atmospheric pressure is accompanied by a corresponding expansion of a firedamp mixture, the expansion in the volume of the firedamp being inversely proportional to the absolute pressure.

*Ques.*—Which is the most difficult gas to contend with in mining? Explain fully.

*Ans.*—In respect to its removal, carbon dioxide gives the most trouble in dip workings and deep shafts, while marsh gas often gives serious trouble when generated in volume in rise workings and at the face of rise headings. In respect to explosive conditions in mines, marsh gas and carbon monoxide present the greatest difficulties, owing to their inflammability when mixed with air in certain proportions.

*Ques.*—What precautions would you adopt to prevent loss of life and property in mines subject to sudden outbursts of carburetted hydrogen gas?

*Ans.*—An ample circulation of air should be maintained, and this should be so conducted and distributed throughout the mine as to ventilate thoroughly all passageways and working places, as well as the waste and void or abandoned places, in every portion of the mine. To guard against accident, duplicate ventilating fans should be installed. Only safety lamps of approved pattern should be used. Every precaution should be taken to prevent the accumulation of dust, by loading out all fine coal and slack and using only dustproof cars.

Permissible powder should be used, and strict regulations should be enforced in reference to blasting. All shots should be inspected and fired by competent persons. The mine should be equipped with an efficient signal system. Due attention should be given to the system of timbering, with special reference to protecting the working faces against the pressure of the gas where this is in the roof or coal. The method of mining the coal should also be given careful attention, to avoid accident from the same cause.

*Ques.*—A mixture of marsh gas and air, at its most explosive point, is passing along an airway 4x5 ft., at an average velocity of 500 ft. per min. What quantity of fresh air must be added to this current so that the gas cannot be detected on a safety lamp?

*Ans.*—The answer to this question will depend on the safety lamp used, and the ability of the observer to discover the flame cap on the lamp. Using the unbonneted Davy, burning sperm or cottonseed oil, it may be assumed that the gas in the air current will not exceed 2 per cent. and escape detection, in ordinary mining practice. The volume of air and gas in this airway is  $(4 \times 5) 500 = 10,000$  cu.ft. per min. A firedamp mixture, at

its most explosive point, contains 9.46 per cent. of gas. The volume of gas, in this case, is, therefore,  $10,000 \times 0.0946 = 946$  cu.ft. per min. If this volume of gas is 2 per cent. of the return current after the air is added, the total volume of the current will be  $946 \div 0.02 = 47,300$  cu.ft. per min. The volume of air to be added, therefore, to produce this result, is  $47,300 - 10,000 = 37,300$  cu.ft. per min.

*Ques.*—How far can a pair of entries be driven before a cap will show on a safety lamp, if an air current of 4000 cu.ft. per min. is passing in the entries, assuming that the coal gives off 1 cu.ft. of marsh gas in every 90 ft. of each entry? Give the proportion of gas and air in the mixture.

*Ans.*—The answer to this question will depend upon the lamp used for the detection of gas and the ability of the observer to discover the flame cap. Assuming that 2 per cent. of gas can be detected by the use of the unbonneted Davy, the air in this current of mixed gas and air would be  $100 - 2 = 98$  per cent. In this case, therefore, 4000 is 98 per cent. of the mixture and the entire volume of gas and air is  $4000 \div 0.98 = 4081.6$  cu.ft. per min. The volume of gas that must be given off by the entries in order to produce this condition is, then,  $4081.6 - 4000 = 81.6$  cu.ft. per min.

Now, if 1 cu.ft. of marsh gas is generated in every 90 ft. of each entry or 2 cu.ft. for every 90 ft. of the pair of entries, the quantity of gas given off is 1 cu.ft. for each 45 ft. of the pair. To generate 81.6 cu.ft., on this basis, would require  $81.6 \times 45 = 3672$  ft., which is the distance a pair of entries can be driven under the assumed conditions.

*Ques.*—A pair of entries 300 ft. long have five crosscuts connecting them at 60 ft. apart, the pillars between the entries being 30 ft. wide. These entries and crosscuts are all filled with marsh gas ( $\text{CH}_4$ ). If an air current of 6000 cu.ft. per min. is available, what is the least time that will be required to clear out this gas, without fouling the air current further than to cause a small cap on a safety lamp? All the places mentioned are 8 ft. wide and 5 ft. high.

*Ans.*—The five crosscuts, each 30 ft. long, represent a length of  $5 \times 30 = 150$  ft., which added to the length of the two entries gives  $2 \times 300 + 150 = 750$  ft. of length. The cubical contents or volume of these entries and crosscuts is, then,  $750 (5 \times 8) = 30,000$  cu.ft. Now, assuming the "small cap" represents 2 per cent. of gas in the current of air and gas, the volume of pure air is  $100 - 2 = 98$  per cent. of the mixture. On this basis, the total volume of the return current of gas and air is  $6000 \div 0.98 = 6122.4$  cu.ft. per min.; and the volume of gas drained off is then  $6122.4 - 6000 = 122.4$  cu.ft. per min. Making some allowance for the difficulty in draining the gas, it would be safe to assume that the air current carries off, say 120 cu.ft. of gas per min. On this basis, the time required to drain these entries and crosscuts would be  $30,000 \div 120 = 250$  min., or 4 hr. 10 min.

## Coal and Coke News

### Harrisburg, Penn.

Four of the big railroad companies, operating in the bituminous region, and representing the Central Freight Association, conferred with the Public Service Commission on Sept. 1, regarding increased freight rates in the western part of the state, as granted by the recent ruling of the Interstate Commerce Commission.

George D. Ogden appeared for the Pennsylvania R.R., F. Y. Sladden for the Pittsburgh & Lake Erie; F. C. Baird for the Bessemer & Lake Erie and T. J. Walters for the Baltimore & Ohio. These men asked the Public Service Commission to grant blanket permission to all roads publishing Pennsylvania Interstate rates to cancel all tariffs now under voluntary suspension effective on or before Sept. 12, and also asked authority to republish the five per cent. rates as modified by the order of the Interstate Commerce Commission on less than statutory notice of three, five or ten days, or to observe the same number of days' notice as may be granted by the Interstate Commerce Commission.

The commission agreed as to the withdrawal of the present rates but reserved its decision regarding the proposition to make effective the five per cent. increase on less than the statutory notice of 30 days. The commission also made it plain that no matter what its attitude on the latter question may be, it would not affect the question as to the reasonableness of the increased rates.

The production of anthracite coal in August was slightly larger than that of August a year ago. Most of the large producing companies report a normal tonnage, but two of them were ahead of last year's record, and the orders from Canada are reported coming in earlier, though not in greater volume, than last year. August shipments will approximate 5,400,000 tons when the official figures are published.

The labor situation continues quiet.

An interesting development is the shipment by the Lehigh & Wilkes-Barre Coal Co. of 1000 tons of egg coal to San Francisco through the Panama Canal. This is the first shipment of anthracite by this route. Anthracite has been shipped to San Francisco by boat in small quantities as ballast around the Horn, but this was a matter of months. It is estimated that it will take the Lehigh & Wilkes-Barre Coal Co.'s shipment 30 days to reach its destination.

No exodus of reservists of the warring nations is reported, although many of the mine workers are natives of them. Russians, including Poles, Lithuanians and Slavonians, predominate, and next come Italians, Irish, Austrians, and Hungarians, Welshmen, Germans and Englishmen in the foregoing order.

#### PENNSYLVANIA

##### Anthracite

**Harrisburg**—Mandamus proceedings were begun Aug. 3 against James E. Roderick, chief of the State Department of Mines in the Dauphin County Court by miners of the Schuylkill County anthracite district who claim that foreman's certificates have been unlawfully withheld from them. The plaintiffs aver that they took the prescribed examinations, passing them, and are now losing money because of the lack of certificates.

**Wilkes-Barre**—After being idle for over a week because of the damage done by a cyclone, the Stanton Colliery of the Lehigh & Wilkes-Barre Coal Co. resumed operations Sept. 1. To repair the damage to a point where the colliery could be operated, the company employed 250 men every day for a week.

**Wyoming**—S. J. Jennings, mine inspector for the Eighth Anthracite District, made presentment to the court recently charging Rissinger Bros., mining contractors, with violating sections of the mine law at the Troy colliery. It is claimed that Rissinger Bros. failed to construct and equip a mine hospital outside of the colliery, also that engine houses built inside the mines were not of inflammable material. The defendants agreed to comply with the law in these respects and the court by agreement held the complaint of the mine inspector pending the elimination of the grounds on which the violation is charged.

**Pottsville**—A severe drought threatens to close the collieries here. Some of the coal companies in order to prevent

this from taking place are making preparation to haul water for steam purposes. The Philadelphia & Reading Coal & Iron Co. is negotiating for the purchase of Lakeside, a large tract of land which would give the company possession of a considerable body of water. The Girard Estate is rapidly completing a reservoir with a capacity of 278 million gallons.

Joseph Gudonis, on Sept. 3, threw himself down the East Brookside shaft, a distance of 1700 ft., meeting death upon a cage, his fall completely severing his limbs and breaking every bone in his body. Gudonis was employed as a contract miner but quit and complaining of headache went home. A short time later he ran madly toward the shaft and dashed himself to death.

**Thropp**—The 1500 mine workers at the Pancoast mine of the Price-Pancoast Coal Co. declared a strike on Sept. 2. Several hundred of the workers, who were not present at the meeting on Sept. 1, when the strike was called, reported for work, but were met by pickets who informed them of the strike order. The men at once returned home. The men have two grievances, the most important being that the fire bosses have refused to remain with the union. The six fire bosses joined the organization some time ago, but recently they resigned, and efforts to get them back have been unsuccessful.

##### BITUMINOUS

**Connellsville**—The advent of September brought no inquiry for furnace coke for the month, and it is evident that the furnaces which bought coke for July and August are covered for September also. At the present time the trend in consumption is apparently downward, undoubtedly by reason of the industrial unsettlement caused by the European War.

**Fayette City**—Miners to the number of 450 walked out of the Warner-Yough mine Sept. 3, because one of their number had been discharged for refusing to work in a room which had water in it. This mine has been running steadily for the past two years. Union officials from Pittsburgh hope to get the men and the company together soon. The closing of this operation leaves only two mines running at this place at the present time.

**Washington**—The Fidelity Title & Trust Co. of Pittsburgh, receiver for the Pittsburgh & Westmoreland Coal Co., filed suit in court recently against the Pennsylvania R.R., to recover \$26,611.83 damages. In April last while cars were being placed in the Hazel Kirk mine, No. 3, it is claimed that the cars derailed demolishing a coal tipple.

**Charleroi**—With a number of the mines along the Monongahela River partially or entirely closed owing to the scarcity of empty craft to load, the shipments of coal down bound passing Lock No. 4 for the month of August were light. The report of the lockmaster shows that 12,648,000 bushels of coal from the mines along the upper Monongahela River were passed through the government lock during the month.

**Seward**—With three shifts of men working eight hours each, operations at the new plant of the Conomaugh Smokeless Coal Co. are being pushed to completion. The shaft is down now a distance of 160 ft. The John Thomas & Sons operations near Cramer are being worked to capacity and heavy shipments are being made. The Keystone Coal & Coke Co.'s mines are working four days a week instead of two or three days, as has been the rule for several months and everything indicates that a big demand for coal is in sight.

##### WEST VIRGINIA

**Charleston**—The report of a wholesale reduction of wages in the mining operations in the Norfolk & Western Field appears to have been decidedly exaggerated. As nearly as can be ascertained the rumor had its origin in the fact that in one operation a slight reduction in the wages of some of the employees was recently made in order to bring them at that particular operation to conform with those made at adjacent mines conducted under similar working conditions. There has been no general reduction either effected or in contemplation.

**Wheeling**—State Mine Inspector, Earl A. Henry, recently stated that the Eastern Ohio coal strike which is creating no comment in this section at the present time is not throwing much business to the mines of West Virginia. This is due

to the fact that the markets for Ohio coal are not easily reached from the mines of this state, the larger part of its production going to the Atlantic Coast while the Ohio coal is mostly sent to the Lakes.

**Fayette**—The contention of the Black Betsey Coal & Mining Co. and the Boomer Coal & Coke Co. that they acted in accordance with the Constitution and the By-Laws in discharging certain of their employees recently was sustained at a conference held between the executive boards of the United Mine Workers and the Kanawha Coal Operators Association. It is stated, however, that the companies will voluntarily give employment to the men whom they discharged.

**Bluefield**—All coal loading records of the Chesapeake & Ohio R.R. in West Virginia and Kentucky coal fields were broken during the month of August. A total of 2,202,115 tons of coal were loaded or an increase of 140,865 tons over that loaded during the month of July. The last day of August broke all records for a single days loading and a total of 113,755 tons were handled or an increase of 3265 tons over Aug. 3 which was the previous record.

Along with new movements for a better citizenship in country, town and city, come new courses in the schools. The Concord State Normal School will this year offer a new course for the benefit of those who expect to go into mining communities to teach. The course will be offered primarily for the purpose of helping the teachers make better schools in the mining sections of the state. The course includes a study of mine gases, their properties and effect on the miner, the analysis of mine air, the use of the barometer and hygrometer, as well as the use and misuse of safety lamps. Moving pictures and lantern slides will be used to illustrate the safe methods of mining, and better means of sanitation for mining towns.

#### TENNESSEE

**Nashville**—The reduction ordered last winter by the Interstate Commerce Commission on freight rates on coal hauled from points in Kentucky, Tennessee and Alabama and by which adjustment of switching practices also was ordered, has been sustained by an opinion handed down in the Federal Court, much to the satisfaction of the commercial interests of this part of the country. J. W. Warrington, Circuit Judge, and John E. McCall and E. T. Sanford, United States Circuit Judge, signed the finding, which it is hoped is the final entry in the long drawn out coal rate and reciprocal switching case.

#### KENTUCKY

**Barbourville**—The wage scale for the union miners employed in this section, where, however, only a portion of the mines are worked by union workmen, is due to be adjusted sometime this month. It was to have been taken up the first week in September but was postponed for later consideration. It is not expected that the adjustment will be attended with any difficulty.

#### OHIO

**Coshocton**—George Lent has started suit in the Coshocton County courts against W. A. and Daisy Hahn to secure a clear title to a tract of coal land which he leased from the defendants in March. The plaintiff says that through oversight there were no witnesses to the lease and he wants the error corrected.

**Columbus**—Professor Frank A. Ray, of the chair of mining engineering at the Ohio State University has just issued a publication entitled "The Ohio Coal Supply and its Exhaustion." Among other things he says that "All calculations upon the depletion of Ohio's coal supply are more or less pure speculations. Our knowledge is yet deficient and we must know more of the facts both as to the coal reserve and the future consumption before the total depletion of the Ohio coal supply can be predicted."

It is stated that hundreds of small coal mine owners who lease their property for operation will be affected by the decision of the State Industrial Commission recently announced which makes the owner liable in all cases of injury for payment of compensation. The desire of mine owners to maintain their property in good condition has resulted in most contracts being so drawn that the lessee is not an independent contractor but merely an agent of the owner.

#### INDIANA

**Indianapolis**—The International Executive Board of the United Mine Workers of America, at a recent session, passed the following resolution:

"Resolved, That we, representing more than 400,000 mine workers of North America, express ourselves as against war in any form. We are for peace and for a peaceful

solution of all disputes arising among nations without resorting to arms; and be it further

"Resolved, That we commend the President of the United States for his efforts in behalf of peace. His offer of the services of our government to the warring nations of Europe as a mediator touched a responsive chord in the hearts of all peace-loving people. In like manner the tactful, wise and patriotic manner in which he conducted affairs so as to prevent our government from becoming involved in a war with Mexico ought to be appreciated by every true American citizen."

#### ILLINOIS

**Herrin**—By a vote of three to one, the miners of southern Illinois have abolished the sub-district system of government, saving the organization thousands of dollars each year in the administration of affairs of the United Mine Workers. Instead of several sub-districts, there will be 12 districts created, and each will be under a president who will handle the work that heretofore has required 10 officials.

**Lincoln**—After an idleness of five months the Latham coal mine recently resumed operation. This company has sufficient contracts to warrant work for several weeks. About 350 men are affected.

**West Frankfort**—For the fiscal year ending June 30, 1914, the mines of Franklin County produced a total of 6,569,099 tons of coal. Twenty-one fatal accidents occurred during the year or four less than the previous year. There were also 137 non-fatal accidents. The Old Ben Mining Co., of West Frankfort, worked 262 days and produced 869,982 tons without a single fatality. It appears that operators are sparing neither pains nor expense in making working conditions as safe as possible.

#### ARKANSAS

**Fort Smith**—Damages to the amount of \$1,283,462.21 are asked in a suit filed in the United States District Court by Franklin Bache, receiver of the Bache-Denman Coal Co. against the national, district and local officers of the United Mine Workers of America. It is charged that the national organization indorsed the destruction of the company's property by fire and dynamite in a riot last July.

#### OKLAHOMA

**Adamson**—Eleven miners were imprisoned on Sept. 4 in the mine of the Union Coal Co., as the result of a cave-in which blocked the mine entrance. On Sept. 7, hope of ever reaching the entombed men alive was abandoned, as it was believed that it would take at least a week to remove the debris at the entrance of the wrecked mine.

#### COLORADO

**Trinidad**—Six arrests were made recently on indictments returned by the Las Animas County grand jury investigating coal strike disorders. Those arrested were William Diamond, international organizer of the United Mine Workers, three saloon men and two strikers. The six are charged with murder on several counts growing out of the battles between strikers and mine guards during October of last year and April of 1914.

**Denver**—Coal land valued at half a million dollars in Jackson County reverted to the government and was lost to the Northern Colorado Coal Co., by a decree recently issued in the United States District Court. By this decree the company must pay the costs of the case and the patent to the land, bought by the company from individuals reverts to the government.

#### UTAH

**Sunnyside**—In spite of unfavorable smelter conditions, the coke plant at Sunnyside is working five days per week, and it is believed that unless something unforeseen occurs, this schedule will prevail for some time to come. With improvements in the copper situation, the plant will again be put on a seven-day-a-week basis.

## Recent Coal and Coke Patents

**Apparatus for Regulating Combustion in Furnaces.** J. F. Canady, Jersey City, N. J., 1,102,718. July 7, 1914. Filed Sept. 21, 1909. Serial No. 518,812.

**Signal System for Mines.** G. T. Plumb, Johannesburg, Transvaal, 1,101,951. July 7, 1914. Filed May 18, 1908. Serial No. 433,541.

**Smoke Washer.** L. Bottenstein, Albany, N. Y., 1,101,996. July 7, 1914. Filed Feb. 9, 1914. Serial No. 817,432.

**Apparatus for Localizing the Effect of Mine Explosions.** J. F. Balfour, Edinburgh, Scotland, 1,102,228. July 7, 1914. Filed July 5, 1912. Serial No. 707,795.

**Superheater Boiler.** J. E. Whittlesey, Pittsburgh, Penn., 1,102,836. July 14, 1914. Filed Mar. 11, 1912. Serial No. 683,136.

**Steam Superheater.** R. C. Stevens, assignor to Skinner Engine Co., Erie, Penn., 1,102,361. July 7, 1914. Filed Feb. 10, 1913. Serial No. 747,368.

## PERSONALS

Geo. W. Evans, consulting mining engineer of Seattle, is in Montana examining coal properties.

A. H. Wood, of Petros, Tenn., president of the Petros Coal Mining Co., is organizing a company for the development of a considerable tract of coal land in Harlan County, Ky.

A. H. Whiteside has recently been appointed vice-president and general sales manager of the Goulds Mfg. Co., of Seneca Falls, N. Y., manufacturers of hand, triplex and centrifugal pumps.

K. W. Rittenhouse, formerly connected with the Central West Coal Co., has taken a position as northern Ohio representative for the William J. Hamilton company, of Columbus.

Thomas J. Barr has been appointed professor of mining engineering in the College of Mines and Metallurgy, at the University of Kentucky, to succeed Prof. H. D. Easton, who recently accepted a position as instructor in the Illinois Miners' and Mechanics' Institute.

John Morris of Beckley, W. Va., is understood to be making arrangements for developing a tract of coal land on Coal River, which was recently secured by him and associates. A charter has been obtained with the object of starting the work of opening up the coal deposit.

F. P. Wright, of Bevier, Ky., was reelected president of the Western Kentucky Coal Operators Association at the meeting held a few days ago in Louisville. Other officers reelected at this meeting were as follows: Vice-president, C. W. Taylor, of Greenville; secretary-treasurer, B. Stewart Miller, of Owensboro.

John H. Jones, mining engineer of Wilkes-Barre, has been engaged by the Scranton School District, together with Ellsworth Davis, of Scranton, in making an investigation of conditions under the No. 40 school building. The engineers will determine which coal company is responsible for a recent disturbance of the surface, which caused damage to the school.

John J. Buttermore, president of the Catawba Coal Co. and George S. Connell have purchased the Elizabeth Mine of the Connellsville Coal & Coke Co., at Montana, W. Va. They will begin operations immediately under the name of the J. J. Buttermore Coal Co. The offices of this firm will be in Connellsville, Penn.

George Hippard, owner of the Coulterville mine and who resides at Belleville, Ill., was seriously injured when he fell from the top of the tipple at the coal mine at Coulterville, while supervising some work. He was given temporary treatment and sent to his home in Belleville, where several fractures of his arms and legs will keep him confined for sometime.

J. W. Reed, who has been an inspector at the mines of the Consolidation Coal Co., at Jenkins, Ky., for eight years, has taken the examination at the College of Mines and Metallurgy, preparatory to applying for the position of first assistant state inspector of mines. The appointment is made by the Board of Trustees of the State University, and the governor issues the certificate.

## OBITUARY

Thomas E. Hughes, manager of the Philadelphia office of the Standard Underground Cable Co., died at his residence in Atlantic City recently. Mr. Hughes had long represented the Standard Co. throughout its Atlantic Coast territory from Philadelphia South, and for the past 17 years had been manager of its Eastern and Southeastern branch office sales department.

## CONSTRUCTION NEWS

**Chattanooga, Tenn.**—It is announced that work on building the million dollar coke oven and byproduct plant of the Durham Coal & Coke Co. in Alton Park will be begun on or about Sept. 30.

**Athens, Ohio.**—Work on repairs of the coal hoisting apparatus at Mine 209 on Sugar Creek is being pushed day and night, and it is hoped that this mine will again be ready for operation within a short time. It has been idle for several days.

**Huntington, W. Va.**—Another new mining town is being built on Allen's Creek in Wyoming County about four miles from Mullens, where the Wyoming Coal Co. is opening a new mine. Houses for the miners are being built and it is expected that the company will begin shipping coal within a few weeks.

**Coshocton, Ohio.**—The Ohio Cannel Coal Co. expects to open its 5-ft. bed of coal underlying 1200 acres in Bedford Township within 30 days. The opening of the mine is in charge of S. B. Priest and George T. Heckle, who with John Orr and Simon Ashcraft own the controlling interest. The company expects to commence building tipples and installing machinery at once.

## NEW INCORPORATIONS

**Columbus, Ohio.**—Papers have been filed with the Secretary of State, changing the name of the Pomeroy Fuel Co. to the Alma-Thacker Fuel Co. The concern is located in Columbus.

**Ottawa, W. Va.**—The Big Eagle Mining Co. has been organized with an authorized capital of \$25,000. The incorporators are J. M. Moore, James Clark, A. M. Rogers, and Edward Zwilling of Ottawa, and George S. Wallace of Huntington.

**Jackson, Ohio.**—The Ohio & Indiana Collieries Co. has been incorporated with a capital of \$150,000, to deal in coal lands and to mine and sell coal. The incorporators are E. E. Morgan, Walter McCloud, David Armstrong, Morgan J. Jones and E. E. Eubanks.

**Scottsboro, Ala.**—The McKenzie Coal Co. has been incorporated with a capital stock of \$7500, to develop mines in Jackson County, Alabama. The officers are A. R. McKenzie, president; John D. O'Connor, vice president; J. H. McKenzie, secretary and treasurer, all of Scottsboro, Ala.

**Crown, W. Va.**—A charter of incorporation was recently granted to the Lowash Coal Co. of Crown, Logan Co., W. Va. This company has an authorized capital of \$20,000, and the incorporators are G. I. Putnam, R. L. Carmichael, Ethel Carmichael, H. B. Summers, Mary A. Summers, of Crown, and Ida L. Putnam of Athens.

**Homer City, Penn.**—An application has been made for a charter for a coal mining and holding concern to be known as the Crown Hill Coal Mining Co. which will operate in central Indiana County. The incorporators are M. A. Lowther, B. M. Barker, and W. C. Lowther. This firm holds considerable coal in the Indiana field.

## INDUSTRIAL NEWS

**Philadelphia, Penn.**—W. A. Stone & Co. have discontinued their branch office in Philadelphia.

**Philadelphia, Penn.**—The Italian steamship "Fert" recently cleared from this port with 7746 tons of coal destined to Italian ports.

**Charlestown, W. Va.**—More than 2000 claims were handled in August by the Workmen's Compensation Division of the Public Service Commission, while in one week over 525 claims were considered.

**Belt, Mont.**—George W. Merkle has acquired a 5-year lease upon the Anaconda Copper Mining Co.'s operation at this point, and will within the next few days place a force of men at work preparing the mine for the production of coal.

**Columbus, Ohio.**—The Ohio Public Utilities Commission has set the time for the suspension of car-service rules on cars

loaded with fine coal to Dec. 1. The application of the Kanawha & Michigan R.R. Co., which brought the action, asked that the suspension be made permanent.

**Columbus, Ohio**—The Ohio Public Utilities Commission has granted the application of the Kanawha & Michigan R.R. Co. for permission to store fine coal on its lines without the usual demurrage charges. This is done in order not to flood the market with small sizes. The order will be issued in a few days.

**Cincinnati, Ohio**—The tow boat "Sally Marmet" struck the Government dredge boat in charge of the "Sea Lion" and sunk three barges of coal at the foot of Manchester Island on Sept. 3. The "Marmet" left for this city with the remainder of the coal. The damage in total will amount to several thousand dollars.

**Washington, D. C.**—Secretary of the Interior Lane recently presided at a conference of American manufacturers of coal tar chemicals, and pharmaceutical products, to determine whether the government can render aid in bringing about an American production of such coal tar products as hitherto have been imported.

**Washington, D. C.**—The third Conservation Bill that the House of Representatives has had under consideration, provides for the operation of coal, oil, gas, potassium and sodium deposits on the public land and is regarded as extremely important. The nation is rich in its natural resources but for want of adequate legislation, too many of these resources are now in a state of non-use.

**Erie, Penn.**—The Lake coal trade is said to be the lightest it has been this season. A number of ships that were idle the forepart of the year because they were dependent upon the coal produced in Ohio, are now busy, but those that carried coal all spring are unable to get it now in anything like operating quantities.

**Connellsville, Penn.**—Advices from the head of the Lakes indicate that the coal docks have a burden of about five million tons and that vessels are not getting as good despatch as a few weeks ago. The railroads are taking only small amounts of fuel, but it is expected that as soon as the grain crops start to move from the Northwest, the roads will load the cars with coal for the return trip.

**Huntington, W. Va.**—The Chesapeake & Ohio R.R. has received a large number of new steel coal cars, which were on order, within the past few months, and is putting them into service as fast as they arrive. This road has taken about 1300 wooden, 40-ton, flat bottom gondola cars out of service, and will put steel center sills into them at the local shops. After this, the cars will be put back in the coal trade.

**Columbus, Ohio**—The Ohio Public Utilities Commission has issued an order requiring the Hocking Valley Ry. Co. to operate an electric car service on the Wellston and Jackson Belt Line, connecting Jackson and Hamden. The electric service was taken off this line several weeks ago and the people along the route protested to the Utilities Commission. The company was not given the alteration of operating a steam service.

**Birmingham, Ala.**—Local industrial circles were recently somewhat agitated by the report that the Tennessee Coal, Iron and Railroad Co. was loading at Pensacola and Mobile cargoes of coal for the Hamburg-American line of ocean steamers. It was said that this coal was paid for in gold as soon as it was loaded. This report, however, which was thoroughly discussed and generally believed has been neither confirmed nor denied.

**Connellsville, Penn.**—The statement of the bituminous coal tonnage originated on the lines of the Western Maryland R.R. shows that during June, shipments amounted to 187,006 tons or a decrease of 41,796 tons as compared with the corresponding month of the previous year. Total shipments during the first six months of 1914 were 1,363,135 tons or a decrease of 182,297 tons as compared with the corresponding period of the previous year.

**Clear Creek, Utah**—The Utah Fuel Co. recently made a record of 360 ft. in one month in driving an 8x12 ft. tunnel through hard rock at its Clear Creek mine. This tunnel will eventually be 4000 ft. long. Two shifts are being worked. Sixty per cent. gelatine powder is used to break the rock, the holes being on an average 6 ft. deep, 3 1/4-in. drills being used. New electric and other equipment will eventually be installed.

**Pittsburgh, Penn.**—The keen inquiry for moderate sized coal tracts convenient to railroads is taken as foreshadowing industrial revival before long. There are few buyers for large coal lands, but wherever a block of minable coal of a few hundred acres is offered for sale, it is disposed of readily at a good price. One broker, who specializes in

coal lands is quoted as recently saying, that in his 12 years' experience, he never before had so many inquiries for coal properties as he has at present.

**Charlestown, W. Va.**—Great Britain has long enjoyed the reputation of having the best conducted and the safest coal mines in the world. A comparison of British records with those of West Virginia, however, reveal some interesting facts. In Great Britain there are 3289 mines as against 817 in West Virginia. The production per employee in 1913 was 267 tons, while in West Virginia it was 855 tons. Each person employed underground in England produced 332 tons, as against 1048 tons in West Virginia.

**Newport News, Va.**—A total of 1,108,539 tons of coal were dumped over Hampton Roads coal piers at Lambert's Point, Sewall's Point and Newport News during the month of August. These figures are expected to be exceeded by the September dumpings as foreign steamers awaiting cargo aggregating approximately 100,000 tons are already in port and a large fleet of others are expected to arrive to load cargoes for foreign countries which hitherto have been getting their coal supply from England and Germany.

**Birmingham, Ala.**—There has been no event in the Birmingham district during the past few years which has so disturbed the coal industry as the proposed increase in coal rates. It is said that the tariff of the railroads if granted by the State Commission will cost the Birmingham district 1,500,000 tons of coal per year. The production in the Birmingham district seldom exceeds 7,000,000 tons per annum, and if from that amount the railroads by proposed tariff cause to be cut off 1,500,000 tons, it will be a severe blow to the industry.

**Columbus, Ohio**—The Jeffrey Manufacturing Co. has issued a monthly publication, styled "Jeffrey Service," which is designed to benefit the employees of the company. W. A. Grievs, superintendent of employment and welfare, is editor-in-chief. Reporters have been named from each of the 50 departments of the huge corporation. The publication is designed "to know more about ourselves." The company has started a co-operative grocery, meat market, shoe store, bakery, dairy and restaurant for the benefit of its hundreds of employees.

**Montreal, Canada**—One and a quarter million tons of coal have been shipped since the opening of navigation to the St. Lawrence ports, Montreal, Quebec, Three Rivers and Levis with 35 steamers of the Dominion Coal Co. as carriers. This indicates that two million tons which are intended to be brought from Sydney during the season of navigation will be sent as the amount already arrived shows that the schedule is being lived up to. The program for September is to bring 350,000 tons of coal to the St. Lawrence ports, most of it being destined for Montreal.

**Washington, D. C.**—The United States Bureau of Mines is planning a comprehensive exhibit for the Panama-Pacific Exposition. The Bureau has in mind not only the value of interesting those engaged in the various mining and metallurgical industries but also the education of the general public to a better knowledge of the magnitude of these industries and to the efforts which are being honestly made by miners and mine operators toward a more safe conduct of mining and a more efficient utilization of the products of the mine after they are secured from the earth.

**Newport News, Va.**—Notwithstanding the embargo on credit which has proved a stumbling block in the way of South American trade since the outbreak of European hostilities, it is an interesting fact that coal shipments have been steadily proceeding during the month of August to Brazilian ports. The Booth Line during this month has sent four steamers from New York and Hampton Roads to Brazil with cargoes to Para, Manaus and Iquitos, Bahia and Pernambuco. These cargoes included 15,000 tons of coal shipped by the company from the railway terminals at Norfolk and Newport News. There is every prospect that these shipments will continue and increase.

**Vivian, W. Va.**—The Pittsburgh Coal Washer Co. recently closed the contract for a large modern steel tipple for the Bottom Creek Coal & Coke Co. This structure will be one of the finest ever built in the Pocahontas field. The same firm is at present building two steel tipples for the U. S. Coal & Oil Co. at Holden, W. Va., one steel tipple for the Main Island Creek Coal Co. at Logan, W. Va., one steel tipple for the Logan Coal Co. at Ethel, W. Va., two steel tipples and car hauls for the Rail & River Coal Co. at Bellaire, Ohio, one steel tipple at the Lick Branch mine of the Pocahontas Consolidated Collieries Co., at Pocahontas, Va., and several wooden tipples at various points throughout the state of West Virginia.

## Coal Trade Reviews

### General Review

**Anthracite trade steadily improving as the season advances. Operations active and the full circular prevails. Bituminous steam trade disappointing in all parts of the country, but operators continue confident as to the future. Market well maintained. Domestic grades beginning to open up as the season advances.**

The anthracite trade is steadily gaining momentum through the fall transitional period preceding the winter rush. The weather is already becoming a potent factor in the situation, some unexpectedly low temperatures having materially accelerated retail buying and created additional activity among the wholesalers. The customary slowing down at the opening of the month has disappeared and most of the companies are now well covered. Full circular prices are generally the rule and a heavy fall and winter business is in sight.

The Eastern bituminous market is generally disappointing though still replete with many latent possibilities. There has been a heavy increase in the foreign trade but even under the most favorable conditions this cannot attain sufficient proportions to directly affect the general market. On the other hand, the more or less complete demoralization prevailing in the world's established channels of commerce, has unmistakably crippled local industries to such an extent as to have a marked effect on the fuel consumption. But in spite of this adverse situation there are occasional reports of an incipient shortage at some points and operators are aggressively maintaining the market, confident of an active trade in the immediate future.

Indications for an early closing of Lake navigation has caused the Pittsburgh district operators to relinquish their last hopes of placing any surplus tonnages in that direction. Prices are spotty and irregular. Complications regarding credits in the Canadian trade are still puzzling producers selling in those markets. A more favorable condition prevails as regards the Lake trade in Ohio and domestic coals are also holding steady; steam grades are slowing down perceptibly and prices are under some pressure due to the tendency to reduce immediate expenditures to the minimum.

There is considerable negotiation on foreign business in the Southern market and domestic trade is beginning to open up with the approach of the fall buying season. Some demand for steam coal is noted in the Middle Western market due, in part, to a tendency among large users to stock up before the car shortage period. The market is erratic but with a favorable undertone.

### ATLANTIC SEABOARD

#### BOSTON

**No significant change in Pocahontas and New River. Local spot demand very light, but contract shipments are well up to seasonable mark. Georges Creek loading slow because of off-shore requisitions. Pennsylvania grades continue strong. Good September in anthracite.**

**Bituminous**—Pocahontas and New River have been marking time and there are no significant developments to report. The export trade is the chief topic of interest and apparently little attention is being paid to the market coastwise. While the volume of receipts here continues large, it is practically all contract, the local market seeming to be about as far removed from an active spot demand as heretofore. Stocks are large at all points and there is not quite the interest on the part of buyers that was predicted a few weeks ago. Many of the textile mills have closed down for a fortnight, beginning Aug. 29, and some will stay closed unless a way is found to get German dye-stuffs.

A few more steam colliers have been put back in commission and most of the agencies are moving a fair tonnage from Hampton Roads. Market cargoes are a little more easily absorbed than a month ago, but the demand for inland shipment is rather spotty and unreliable.

The Georges Creek shippers have more business just now

than they can comfortably handle. The off-shore demand is strong and coastwise boats are frequently being held until clearance is given steamers for foreign ports. In some cases bottoms intended to load this grade have been diverted to Hampton Roads loading.

There is practically no change in the generally strong position of the Pennsylvania grades. All-rail there is a steady demand and consumers are beginning to urge shipments with more frequency. Most of the shippers are optimistic over the fall prospect and with Georges Creek beginning to break down on deliveries and Hampton Roads coals in line for heavy business later, it is hard to see anything unfavorable ahead, especially for the more popular grades. Prices have not changed except in scattered instances.

**Anthracite**—The early September demand has exceeded exceeded expectations. Orders are coming in freely. The retailers are up to their maximum for deliveries and they are likely to continue so throughout the month. A few independent offerings have been made at 5@10c. off the current circular, but as usual little tonnage was placed. Most of the companies already have about all the September orders they can handle and there is no doubt now that the market will be active for the balance of the season.

Current prices on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	\$0.90@1.50	\$1.25@1.65	\$1.67@1.77	
Philadelphia*	2.15@2.80	2.00@2.90	2.92@3.02	
New York*	2.45@3.10	2.80@3.20	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				\$2.85@2.95
Boston†				3.63@3.68
Providence†				3.63@3.78

\* F.o.b. †On cars.

#### NEW YORK

**Satisfactory bookings ahead in anthracite. Insistent demand all rail and individual coals now bringing the full circular. Bituminous demand on contracts increases. Prompt market continues rather flat, though the outlook is hopeful.**

**Anthracite**—The demand for anthracite domestic sizes for rail shipment, both East and West, continues in good volume, although not quite as strong as the latter part of August. Orders are now booked ahead for perhaps two or three weeks and with anything like a turn in the weather conditions the demand for all domestic sizes should increase. Stove continues to be the short size in all the markets. The activity in the rail markets has had a tendency of taking individual coal away from tidewater, the result being a general stiffening of prices and all sizes in the standard grades are now bringing the full circular.

The demand for pea coal for rail shipment has improved materially, but it is still inactive at tidewater. The fine sizes in the higher grades are in good demand, whereas inferior coals in the buckwheat sizes are begging.

There is a more or less general movement on the part of the retail dealers toward urging the consumer to put in his supply at once. This, in view of the increase in prices of other staple commodities due to the war is effecting the movement of retail coal and the trade generally looks for a very active and winter demand.

The market continues quotable on about the same basis as last week as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	\$5.10	\$1.60@5.10	\$5.05	\$4.55@5.10
Egg	5.35	5.10@5.35	5.36	4.95@5.30
Stove	5.35	5.35	5.30	5.30
Chestnut	5.60	5.50@5.60	5.55	5.35@5.55
Pea	3.55	3.45@3.55	3.50	3.20@3.50
Buckwheat	2.80	2.75@2.80	2.50@2.75	2.10@2.75
Rice	2.30	2.30	2.00@2.25	1.60@2.25
Barley	1.80	1.75@1.80	1.75	1.30@1.75

**Bituminous**—Conditions generally seem to be improving. While the railroad-supply movement shows a falling off as compared with August, there is a notable improvement in the demand from commercial users, though the majority of the coal is moving on contract. Probably it is too early to say what effect the European war will have on general manufacturing business, and there may be no definite de-

velopments along this line for several months, but should there be a largely increased demand for goods manufactured in the United States, the coal business will be benefited.

The cooler weather should bring a larger demand, and the increased exportation of coal is a favorable factor. Reports from the mining regions indicate a more hopeful view on the part of the operators, practically all of whom report more orders for the month of September. While some coal is being offered at tidewater at low figures, the larger operators have made no change in their prices. We continue nominal quotations of last week as follows: West Virginia steam, \$2.50 @ 2.60; fair grades Pennsylvania, \$2.55 @ 2.65; good grades of Pennsylvania, \$2.70 @ 2.80; best Miller Pennsylvania, \$3.10 @ 3.15; Georges Creek, \$3.15 @ 3.25.

#### PHILADELPHIA

**Situation about the same as last week although demand is not so marked, and activity in certain sizes has fallen off. Labor Day holiday causes a decrease in output. Bituminous still uncertain, but a better feeling prevails.**

**Anthracite**—The last week of August saw a large influx of orders, with instructions to ship that month or cancel. This was particularly true of the rail business, although the Tidewater trade was also heavy. With most of these orders cleaned up, the market has eased off again, and while there is every indication that it may start up at any time, it is now the indifferent period between the summer dullness and fall activity.

The operations at the mines the past week have had their usual September set back, due to the holiday on Monday. It is understood that most of the mines commenced operations on Wednesday morning, and continued for the balance of the week. Outside of the chestnut and pea sizes, the market still continues to absorb the output. Prices at Tidewater are as follows:

	Circular	Individual
Broken.....	\$4.75	\$4.75
Egg.....	5.00	5.00
Stove.....	5.00	5.00
Chestnut.....	5.25	4.90 @ 5.00

**Bituminous**—There seems to be a much better atmosphere to the bituminous situation. Consignees at Tidewater are complaining that they cannot get the coal when they want it. This applies particularly to the better grades. This undoubtedly indicates that the rail business is improving, and it is confidently expected that the end of the month will find a much better feeling all through, this branch of the trade. The outlook is promising, although there are no definite predictions as to when the improvement will occur. There is considerable tonnage moving, but the prices are not satisfactory. The demand does not seem to warrant any increase in current quotations.

#### BALTIMORE

**Export trade continues to grow but local conditions fail to improve. Slack still farther off color. Prices generally low.**

In the face of a growing export trade the domestic situation seems remarkably dull. In some cases, notably with slack, there have been sales below the quotations of last week.

At the export piers it is said that the daily shipment keeps growing. New connections are constantly being made abroad or in South America, and the coal of this country is at last a genuine competitor with the Welsh product. Charters are particularly heavy for the Argentine Republic, and many inquiries are in from that country, which is reported short of fuel.

At the mines of West Virginia, Western Maryland and Western Pennsylvania there are general reports of poor demand. The light call for industries using slack has caused that fuel to touch as low as 50c. and sales five cents off that have been recorded in some cases. Three-quarter gas is selling around 30c. at the mines in West Virginia. Pennsylvania low grade fuels are obtainable as low as 95c. to \$1, and medium to best grades are offering at from \$1.15 to 1.35.

#### HAMPTON ROADS

**Shipments moving both foreign and coastwise. Inquiries still coming in for large cargoes for export. Dumpings for August amount to 1,108,539 tons.**

Dumpings at tidewater for the past week have been heavy, coastwise shipments have shown up well and a large number of cargoes have moved to foreign destinations. Foreign buyers continue to look to Hampton Roads shippers for supplies and inquiries are coming in daily for large cargoes to be shipped to various South American ports; although actual sales are being made, and cargoes moved, it is difficult to ascertain at what price coal was sold.

Shipments are also moving to a number of European ports. It is understood that prices on the export coal range from \$2.85 to \$3, although only a small part of the coal is being sold at the latter figure.

Cargoes moving foreign during the week went to Elba, Iquique, Kingston, Canal Zone, Rio de Janeiro, Curacao, Port of Spain, Piraeus, Buenos Aires, Chacarillo, Genoa, Gibraltar, Para, Cagliari, and Barbadoes. In addition, the U. S. Government has taken one large cargo to be landed at Cavite or Olongapoo, P. I.

There is a fair accumulation of coal in the various railroad yards with shipments coming in promptly from the mines and unless there should be an exceptionally heavy demand for prompt cargoes shippers at Hampton Roads are well prepared to take care of large orders. The war conditions caused export shipments to increase greatly during August and in consequence dumpings for that month have reached well over a million tons. The dumpings over the Norfolk & Western piers at Lamberts Point amounted to 539,607 tons, from Newport News over the C. & O. Ry. piers 285,053 tons and from Sewalls Point over the Virginian Ry. 283,879 tons or a total for the three piers of 1,108,539 tons.

The Spanish Cruiser "Carlos V" is at present repairing at the U. S. Navy Yard and will take on a supply of bunker here before proceeding on her homeward voyage.

## LAKE MARKETS

#### PITTSBURGH

**Demand light all along the line and market unsatisfactory. Prices continue irregular and well below the circular figures. Mining at about 65% of capacity.**

Pittsburgh district coal operators have hopes that eventually the war will improve trade, by increasing exports, at least from other districts, but thus far at any rate the influence has been in the opposite direction, exports being light and so many vessels remaining in port that consumption is reduced. The last hopes for an improvement in the Lake trade are now gone and shipments are expected to be relatively light for the remainder of the season, with an early closing of navigation at that. Manufacturing demand keeps up fairly well, but is scarcely as heavy as a fortnight ago, and the retail dealers are not yet stocking up to any extent.

Altogether the position of the coal market is quite unsatisfactory and compares unfavorably with a fortnight ago. Mine operations average about 65% of capacity. Prices continue extremely irregular, both for free coal and upon contracts. For prompt shipment slack is 50 @ 60c. and mine-run is done at only a trifle above a dollar. Circular prices are unchanged, but purely nominal: Slack, 90c.; nut and slack, \$1.05; nut, \$1.25; mine-run, \$1.30; 3/4-in., \$1.50, per ton at mine, Pittsburgh district.

#### BUFFALO

**Little life to the bituminous trade and not much indication of improvement. War influence and the financial outlook the controlling factors. Anthracite is doing better.**

**Bituminous**—There is difference of opinion as to the state of trade, some finding the demand fairly good, while others report it as poor; the latter class doubtless predominates. One difficulty is with the Canadian trade; Canada is not paying for coal promptly and there is doubt as to the future liabilities. Some shippers are declining to sell to new customers there, on the grounds that if old connections are not satisfactory new ones are not apt to prove so. The situation is not pleasant. There is a general hesitation in every direction. The European war has hurt all branches of business and if it lasts very long there will be no money left in Europe to buy anything with; in addition, it may be many years before the old purchasing power returns.

**Anthracite**—There is some slacking off of trade early in the month, as usual, on account of extra buying late last month to escape the 10c. advance, but the regular fall trade is now in sight. The improvement in demand is everywhere reported. The independent anthracite dealers claim an almost full trade and at this rate there will soon be the usual fall clamoring for stove and chestnut. The Lake trade is not good for this time of the year. There is now trade enough in the West to relieve the Upper-Lake docks, so that there is room for coal there, but there is complaint that the coal is not coming forward freely, the inference being that the Eastern demand is looking up.

Anthracite shipments by Lake for the week were only 95,000 tons; for the month, 509,620 tons, and for the season, 2,728,355 tons, as against 3,308,821 tons to date last year.

## TOLEDO

**Domestics in fair demand and prices close to the list. Fine grades in excess supply and difficult to move. Lake shipping heavier than for some time.**

The coal situation is looking brighter than for a long time past and dealers are inclined to take an optimistic view. There is a fair demand for domestic coal and prices are close to the list. A strong effort is being made to bring up the price of Hocking lump. Fine coal which formerly brought 70c. is now selling at 25c., and with but little demand. It is believed that there will be a cessation of operations shortly, unless there is an improvement in the price of fine coal.

Pocahontas can no longer be secured at circular prices and the market on lump is now \$2.50. The Lake shipping is stronger than it has been for some time and more boats are moving. The coal was well cleaned up here one day last week and there was some real demand, which was, however, quickly supplied. There is as yet no congestion on the railroads. The Pittsburgh No. 8 scale committee has not yet reached a settlement.

## COLUMBUS

**Lake and domestic trade fairly active but steam business continues slow. The new circulars well maintained. Small sizes very weak.**

The best features of the trade during the past week are the strength in the Lake and domestic departments. Both are showing a good tone and future prospects are considered bright. The steam business is slow and there is not much prospect for a betterment in the immediate future.

Fuel requirements for manufacturing are generally small as business is at a low ebb. Many factories are closed down and others are being operated with a curtailed force of men. Consequently they are not buying steam coal in as large quantities as formerly. Most of the steam contracts which have been closed are at fairly profitable figures. In the railroad-fuel business, practically all of the larger contracts are still to be let.

Lake trade is still active, although the Toledo docks of the Hocking Valley Ry. did not show up as good last week as in previous weeks. The demand from the Northwest is still good and docks at the Upper Lake ports are generally in good shape. An interior movement from the docks has started. It is predicted that there will be activity in the Lake trade up to the closing of navigation.

Prices in the Ohio fields are:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Rescreened lump.....	\$1.70		\$1.75	
1 1/4 inch.....	1.60		1.60	\$1.60
1 1/2 inch.....	1.45	\$1.20	1.45	1.45
Nut.....	1.15		1.50	1.15
Mine-run.....	1.20	1.05	1.15	1.15
Nut, pea and slack.....	0.35		0.45	0.35
Coarse slack.....	0.25	0.35	0.35	0.25

## CLEVELAND

**Retail trade brisk, but other demands are comparatively light. Markets flooded and prices have been forced lower. Lake movement light.**

The coal trade is much the same as it was a week ago. The low prices at which operators have disposed of their products have forced quotations lower, but the demand has not increased. With most plants shut down last Sunday and Monday, there was no great demand over the week end. Another reason for the excess supply of coal is the meager Lake shipments. So many of the docks are not taking their usual quota of coal that operators have flooded the other markets to keep their mines going.

The condition of the market is well illustrated by the following quotations:

	Pocahontas	Youghiogheny	Bergholz	Fairmount	W. Va. No. 8
Lump.....	\$3.85				
Lump, 6 in.....		\$2.50			
Egg.....	3.85				
Egg, 6 in.....		2.10			
Lump, 1 1/4 in.....	2.50	2.20			
Lump, 1 1/2 in.....	2.25	2.15	2.05	2.05	
Mine run.....	2.75	2.15	1.95	1.90	1.95
Slack.....	2.55	1.60	1.60	1.60	1.55

## CINCINNATI

**Domestic and steam business dull. Labor and transportation facilities are plentiful. Some foreign demand.**

The closing down of some large manufacturing plants has resulted in a worse situation locally. Other plants are running on short time, and the net result is that the steam market is slower. Small domestic consumers are waiting until an actual need for fuel arises, because of lack of money with which to buy other necessities. An optimistic view is still maintained.

Dealers are not buying to any extent just now, and the movement has been reduced to practically nothing, although there is still some coal going to the Northern and Northwestern markets by all-rail routes. There are plenty of cars offered, and men are in good supply.

## COKE

## CONNELLSVILLE

**Coke market absolutely stagnant. Consumption promises some decrease, but production and shipments unchanged thus far. Prices not quotably changed, but probably largely nominal.**

The market has been completely stagnant since last report, but this represents no material change. Four merchant furnaces, depending upon the Connellsville region for coke are just blowing out and shipments of coke have already been discontinued. One, however, will blow in late this week. Consumption by the steel interests is unchanged since they are keeping their furnaces in blast even though steel production has been slightly reduced. News has just come out of a transaction made quietly three weeks ago, a valley interest buying coke for September and October shipment to two furnaces, involving about 25,000 tons altogether, the price being \$1.75. Possibly this figure could now be shaded. Market quotations are approximately as follows, though largely nominal: Prompt furnace, \$1.70@1.75; contract furnace, \$1.75@1.90; prompt foundry, \$2.25@2.35; contract foundry, \$2.35@2.50, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Aug. 29 at 25,683 tons, an increase of 18 tons, and shipments at 273,397 tons, an increase of 9284 tons. Shipments have been exceeding production for several weeks past, reducing the amount carried in stock.

## BUFFALO

There is no stir in coke, as the furnaces are all running about as slow as ever, but some dealers find a slight shortage of stock coke and are quoting a few cents more. Local receipts of iron ore are good and stock piles are not unusually large. Quotations are on the basis of \$4.25 for best 72-hr. Connellsville foundry and \$3.30 for stock coke.

## BIRMINGHAM

The coke market shows very little change over last week, but present indications are that it will shortly improve.

## SOUTHERN

## BIRMINGHAM

**Market seems stronger than for some time. Negotiations on the South American order still under way.**

While the local demand for steam coal is about the same as last week, the war has brought out heavy orders for bunker fuel at all Southern ports. One of the large operators is shipping about 1000 tons per day through the port of Pensacola for bunker purposes, and the demand at both Mobile and New Orleans has increased.

The South American business has not yet been definitely placed, due to the fact that conditions pertaining to bottoms and finances have not yet been completed; they are reported well under way, however, and it is hoped that arrangements can be completed within a short time. Some of the large operators have accepted orders subject to these arrangements being made.

Lump coal seems to be in better demand and September business promises to be much larger than August. Blacksmith coal is in a satisfactory condition with prices remaining firm. Pig iron manufacturers report many small sales with prices the same as last week.

## LOUISVILLE

**Trade marking time. Domestics fair but steam grades heavy. Large inquiry from Brazil.**

The Kentucky trade is marking time. Prices quoted the first of the month run only to the fifteenth, and are subject to change at that time. The domestic market continues the most active, with some improvement in the industrial section of the market, though not as much as could be wished.

Prices, f.o.b. mines, are: \$1.75 for block, \$1.42 for 2x4 round and from 75 to 85c. for the best grades of nut and slack. Low-grade steam sizes are more or less a drug on the market.

## MIDDLE WESTERN

## INDIANAPOLIS

**Improvement in the demand for domestic grades continues.**  
Extra supply of screenings has caused the price to slump to 40c. Better buying of steam grades while cars are plentiful. Mines on better running schedules.

The collapse in the price of slack is the feature of the Indiana market. Two weeks ago this was in strong demand at 90c. to \$1 a ton at the mines but now it is said there are offerings at less than that range, though there are also sales up to 70c. The slump is the result of the better movement of domestic grades and the consequent increase in the supply of screenings.

Good domestic coal is selling at \$1.75; the best grade of mine-run at \$1.20 for No. 4 and \$1.10 for No. 5. There is also a slightly improved demand for steam coal, due probably to the desire of the plants to accumulate a coal pile before the season when the car shortage develops. There are plenty of cars available at present. The mines are making better time as a result of the demand for lump coal. Some of the large mines are on full time and operations over the state generally are considerably better than half-time. Retailers have made no advance in September prices yet.

## CHICAGO

**Steam trade light while demands for domestic coal are unusually heavy. Indiana operators also report a strong demand for domestic sizes. Prices for screenings continue to decline.**

The domestic trade is unusually heavy but the steam trade is equally light. With the advent of cooler weather buying of coal for domestic purposes has taken on its customary activity and dealers report a satisfactory business.

The price for screenings has been on a decline for several weeks, 35c. a ton at the mines being a common figure. A considerable improvement has been noted in the demand for anthracite coal. The circular price on Hocking and splint has advanced 10c. a ton to \$1.60. The smokeless situation remains about the same.

Prevailing prices in Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump.....	\$2.22	\$2.55@2.80	\$2.27	
Steam lump.....	1.87@1.92		1.97	
Egg.....		2.15@2.25		\$3.30@3.45
Mine run.....	1.87	2.55@2.80	1.87	4.05@4.30
Screenings.....	1.12@1.17	1.45@1.55	1.12@1.17	

Quotations for Harrisburg coal are: Domestic lump and egg, \$2.55@2.80; steam lump, \$2.15@2.20; mine run, \$2.15@2.25; screenings, \$1.45@1.55; No. 1 nut, \$2.55@2.80; No. 2 nut, \$2.40.

Carterville prices are: Lump and egg, \$2.55@2.80; No. 1 washed, \$2.80; No. 2 washed, \$2.35@2.40.

## ST. LOUIS

**Market erratic and uncertain, but generally weak, particularly as regards the steam grades.**

There is a somewhat uncertain tone to the market, occasioned principally by the fact that in the past two weeks the demand for high-grade 6-in. lump coal has exceeded the supply. This caused the market to advance to \$1.75@2, as compared with \$1.35@1.60 a few days previous. The high prices stopped the buying, and this sudden curtailment in the production of lump and egg was the only thing that saved the steam market from utter ruin. The result is that the past few weeks, prices for lump and egg have been a trifle unsteady, while the demand for No. 1 washed has picked up, though all the other sizes of washed coal have gone down. Screenings are also weak and are dropping.

This pertains to the coals from the Williamson and Franklin County fields. Indications are, however, that the market on these grades will continue to be good, although steam sizes may drop to a lower figure than in past years, on account of the depression in manufacturing circles.

Williamson and Franklin Co.	Big Muddy	Mt. Olive	Stand- ard	Sparta
2-in. lump.....	....	\$1.05	\$0.90@1.00	\$0.90@1.00
3-in. lump.....	....	1.30	....	....
6-in. lump.....	\$1.65@1.85	1.40	1.10@1.20	1.15@1.25
Lump and egg.....	1.85@2.15	\$2.25	....	1.15
No. 1 nut.....	1.25@1.50	....	....	....
Screenings.....	0.70@0.75	....	0.80@0.85	0.30@0.35
Mine-run.....	1.00@1.15	....	0.75@0.80	....
No. 1 washed nut	1.50@1.60	2.25	1.50	....
No. 2 washed nut	1.25@1.35	....	1.35	....
No. 3 washed nut	1.10@1.15	....	....	....
No. 4 washed nut	1.00@1.05	....	....	....
No. 5 washed nut	0.25@0.30	....	....	....

## KANSAS CITY

**Retail trade slightly better. Prices did not advance as usual on Sept. 1. Situation unsettled.**

Cooler weather was a factor in larger retail trade. Prices did not advance Sept. 1; there was a general feeling, however, that the advance will occur Sept. 15. It is very generally expected among Kansas City wholesalers that prices will be raised 25c. a month during the interval between the middle of September and December, and some say this will continue to February.

Steam and slack coal are irregular; high-grade Missouri block coal is ten cents higher at \$2.10. There has been a good market here for Illinois coal. The settlement of the strike in the Kansas field promises more liberal and steady supplies.

## PORTLAND

**Supplies light and regular circular has been advanced. Some mines closed down.**

Utah and Wyoming coals advanced 50c. Sept. 1 and are now selling at \$10 for lump and \$9.50 egg, retail, with no reduction on larger than three-ton lots. Dealers say that the supply on hand is exceedingly light and that the advance is fully justified by conditions.

Some of the mines are shut down, among them being the big Carbon Hill mine and the MacKay and Hyde mines.

No coal is reported coming here from Australia this season and whether any will come from the Atlantic Coast by way of the Panama Canal has not been ascertained yet.

## FOREIGN MARKETS

## ENGLAND

**Prices irregular and production heavily restricted. High water freights and heavy war insurance charges complicate the situation.**

The London coal trade is moving very quietly this week. Best coals maintain their prices, but all second qualities are difficult to sell. Fortunately the supplies are limited through the dislocation of the railway traffic and short time at the collieries, or the depots would become congested. Prices are very irregular. The shipping trade is weak.

Now that the bond and embargo on the exportation of coal have disappeared, the coal trade at the exporting centers is gradually recovering from the stagnant position in which it has remained since the outbreak of the war. There are still many difficulties, however, which continue to restrict trade, and among these those of high freight and war insurance risks rates and of finance may be mentioned as the more important.

On the whole the demand has been healthier during the past week, and altogether the outlook has improved. Although the Wear market is still greatly disturbed, the situation is more promising. At Cardiff the withdrawal of the triple bond has served as a great stimulant to the outward market, though the home demand has fallen off somewhat. In the Midlands business is quiet, especially in Lancashire.

A deputation of trade unions laid certain proposals before the Prime Minister for alleviating the financial effect of the war upon unions.

A special conference of the South Wales Miners' Federation is to be held to consider means for alleviating the distress caused by the restriction of employment at some of the collieries.—"The Colliery Guardian."

## ITALY

There are no manufacturers of importance at Brindisi, and the coal imported from the United Kingdom and United States is mainly used for bunkering, the manufacture of patent fuel, and by the railway. In 1913, 153,884 tons of coal were imported. At Bari 105,398 tons were imported, at Barletta 52,079 tons, and at Taranto 70,653 tons.

According to the Corrier d'Italia, a report on the quantities of coal existing in the harbours of Genoa, Savona, Naples, and other important stations on the Italian seaboard, was demanded by the Council of Ministers on Thursday last, and the next day Commissioners commenced an inspection, with a view to giving the required information. The British coal export trade having been seriously injured by the outbreak of hostilities, especially as large quantities of British coal used to be taken by Germany, it is suggested that the moment is now a propitious one for arranging a considerable export of coal to Italy. The managing board of the Italian State Railways is, our contemporary learns, prepared to place very large orders for coal in Great Britain, as well as in America.—"The Colliery Guardian."